The American School and University

A YEARBOOK DEVOTED TO THE DESIGN, CONSTRUCTION, EQUIPMENT, UTILIZATION, AND MAINTENANCE OF EDUCATIONAL BUILDINGS AND GROUNDS

1940

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Foreword

By RAYMOND V. LONG

Director School Buildings, State Board of Education, Commonwealth of Virginia

DURING the past decade there has developed a school-plant consciousness that is challenging the best thinking in the nation on the subject of functional planning in terms of present and projected needs. The general public is more aroused than ever before in its demands and expectations of what the school plant should offer by way of space facilities, and as a consequence of this general public concern and interest modern school plants are becoming more than mere shells of our educational programs.

THE demand for school-plant facilities that will accommodate educational offerings designed to meet modern needs is requiring of school administrators and school architects responsible for school-plant planning a more intimate and detailed knowledge of what a modern educational offering should provide, as well as familiarity with the essentially necessary space requirements that should be incorporated in the school plant. A review of the discussions in this volume and previous volumes of THE AMERICAN SCHOOL AND UNIVERSITY by those in responsible charge for planning school buildings and equipping them will reveal that this publication is a highly valuable series of handbooks or an encyclopedia to the school administrator, school architect, and other school authorities who are seriously concerned with planning school buildings and equipping them in terms of modern demands and needs.

IF we are to provide educational offerings that serve the needs of youth and adults, the school plant must be so planned that it serves the educational program without dictating it. Much has been written and discussed in recent years concerning modern educational needs, but those in responsible charge of planning new school plants to meet these educational needs find relatively little by way of authoritative guides in planning the new school plant. THE AMERICAN SCHOOL AND UNIVERSITY is making an outstanding contribution that from year to year is being more widely recognized by school authorities and school architects in collecting and publishing authoritative information in this field.

MUCH has been accomplished during the past five years by way of providing sorely needed new school buildings under the PWA program. We must recognize the fact, however, that only a relatively small proportion of the serious school-building needs have been cared for. During the summer of 1939 the PWA returned approximately 5,000 school-building applications, aggregating in cost $346,000,000. In addition to this, there were thousands of requests for permission to file additional applications, requests which could not be considered by the PWA.

THERE appears to be a growing conviction that the Federal Government can discharge a portion of its obligation to public education by continued Federal aid to public school buildings, and that such Federal aid can be extended with less objection than any other method that has yet been proposed for Federal aid to education. In realization of this fact, the present Congress is being requested to adopt a ten-year program of Federal aid for school buildings that will involve careful projected planning in terms of growing and changing school-building needs, as well as the functional planning of the school plant.

THIS volume, along with previous volumes, will prove abundantly helpful to the future programming and planning of school buildings which must be very actively engaged in during the next ten years if public education is to function as the general public is expecting and demanding.

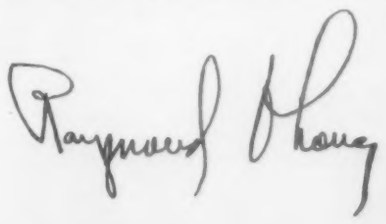

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Table of Contents

PAGE

FOREWORD 5

EDITORIAL BOARD OF ADVISORS 6

INDEX TO SUBJECTS 10

INDEX TO AUTHORS 12

I. Building Costs and Financing

SCHOOL-BUILDING COSTS 13
By N. L. Engelhardt, Jr., Research Assistant, Institute of Educational Research, Teachers College, Columbia University

FOUNDATIONS AS A SOURCE OF AID TO EDUCATION 19
By Ernest Victor Hollis, College of the City of New York

II. Design and Construction of Buildings

PLANNING SCHOOL BUILDINGS 22
By James A. Stripling, School Architect, State Department of Education, Tallahassee, Fla.

TULSA BUILDS A HIGH SCHOOL FOR CHANGING SECONDARY EDUCATION 28
By C. B. Manley, Principal, Will Rogers High School, Tulsa, Okla.

BETTER RURAL SCHOOL BUILDINGS 36
By Hans W. Schmidt, Supervisor, School Building Service, State Department of Public Instruction, Madison, Wis.

ACOUSTICAL PLANNING FOR MODERN SCHOOLS 43
By J. P. Maxfield, Director of Commercial Engineering, and C. C. Potwin, Technical Consultant, Electrical Research Products Inc.

PLANNING SMALL TWELVE-GRADE SCHOOL BUILDINGS FOR MULTIPLE SERVICE 51
By Knute O. Broady, University of Nebraska, and Merle A. Stoneman, University of Akron

THE DEVELOPMENT OF THE SCHOOL-BUILDING PROGRAM FOR KANAWHA COUNTY, WEST VIRGINIA . . 54
By M. M. Konarski, Charleston, W. Va.; Consulting Architect for the Building Program

MECHANICAL AND ELECTRICAL ENGINEERING CONSULTANTS FOR UNIVERSITY AND SCHOOL PROJECTS . 62

III. Architects for Educational Buildings 169

IV. Operation and Maintenance

MAINTENANCE OF BUILDINGS AND GROUNDS AT WASHINGTON AND LEE UNIVERSITY 177
By J. Alexander Veech, Superintendent of Buildings and Grounds, Washington and Lee University, Lexington, Va.

TESTING SUPPLIES AND EQUIPMENT IN TERMS OF PERFORMANCE 182
By Joseph L. Ernst, Purchasing Agent, Board of Education, Rochester, N. Y.

A SUMMER RENOVATION AND RECONDITIONING PROGRAM 185
By R. H. Park, Assistant Superintendent in Charge of Operation and Maintenance and Purchasing, City Public Schools, Lincoln, Nebr.

V. Landscape Design and Development

MAINTENANCE OF SCHOOL GROUNDS 217
By Thomas H. Desmond, Landscape Architect, Simsbury, Conn.

THE COMMUNITY LANDSCAPING PROGRAM OF CABOOL CONSOLIDATED SCHOOLS, TEXAS COUNTY, MISSOURI 223
By Frank Heagerty, Superintendent, and W. W. Hoy, Vocational Agriculture Instructor, Cabool Consolidated Schools

LANDSCAPE ARCHITECTS FOR UNIVERSITY AND SCHOOL PROJECTS 226

PAGE

VI. Physical Education and Athletics

PHYSICAL EDUCATION FACILITIES FOR THE COLLEGE WOMEN OF TOMORROW 246
By Ruth Elliott Houston, Professor of Health Education and Director of Gymnasium, State Teachers College, Buffalo, N. Y.

THE COOPERATIVE ORGANIZATION OF RECREATION IN CINCINNATI 256
By Claude V. Courter, Superintendent of Schools, Cincinnati, Ohio

COMMON ERRORS IN PLANNING, CONSTRUCTION, OPERATION, USE AND ADMINISTRATION OF SWIMMING POOLS 261
By Frederick W. Luehring, Professor of Physical Education, University of Pennsylvania

THE NEW GYMNASIUM AT THE UNIVERSITY OF NORTH CAROLINA 265
By R. A. Fetzer and Oliver K. Cornwell, Department of Physical Education and Athletics, University of North Carolina

VII. Classroom—Library—Auditorium

JUNIOR HIGH-SCHOOL CLASSROOMS 293
By Ralph Evans Hacker of Hacker & Hacker, Architects, Fort Lee, N. J.

INSTALLING THE SCHOOL RADIO 298
By Francis R. Scherer, Architect; Superintendent of School Buildings, Rochester, N. Y.

PLANNING ROOMS FOR MUSIC DEPARTMENTS IN SECONDARY SCHOOLS AND COLLEGES 301
By Charles J. Lamp, Supervisor of Music, San Francisco Public Schools

PLANNING THE JUNIOR COLLEGE LIBRARY 308
By Cecil D. Hardesty, Acting Superintendent of Schools, Montebello, Calif.

PLANNING THE SCHOOL STAGE 313
By Alice Barrows, Senior Specialist in School Building Problems, U. S. Office of Education, and Lee Simonson, Scenic Designer and Theater Consultant, New York City

DEVELOPING A FUNCTIONAL AUDIO-VISUAL EDUCATION PROGRAM 316
By Alex. Jardine, Director, Audio-Visual Education, Evansville, Ind., Public Schools

VIII. Commercial Department—Administrative Office

RECORD-KEEPING SYSTEM, PUBLIC SCHOOLS, STAMFORD, CONN. 368
By B. Frank Whitford, Director of Child Accounting, and Leon C. Staples, Superintendent of Schools, Stamford, Conn.

LAYOUT AND EQUIPMENT FOR BUSINESS EDUCATION DEPARTMENTS ON THE SECONDARY-SCHOOL LEVEL 373
By M. E. Studebaker, Head of Department of Business Education, Ball State Teachers College, Muncie, Ind.

IX. Cafeteria—Home Economics—Dormitory

THE DESIGNING OF COLLEGE DORMITORIES 421
By Howard Dwight Smith, University Architect, Ohio State University

EQUIPPING THE SMALL HOMEMAKING DEPARTMENT 435
By Ruth Freegard, Chief, Homemaking Education Division, Michigan State Board of Control for Vocational Education

FINE POINTS OF FOOD-SERVICE EQUIPMENT DESIGN 438
By Owen Webber, Counsel on Public Feeding

X. Laboratory Design and Equipment

THE HIXON LABORATORY FOR MEDICAL RESEARCH 489
By H. R. Wahl, M.D., Dean, University of Kansas School of Medicine

LABORATORY TABLES FOR A PHYSIOLOGY LABORATORY 496
By George Edward Gage, Head, Department of Bacteriology and Physiology, Massachusetts State College

NEW GREENHOUSE EQUIPMENT AT THE MASSACHUSETTS STATE COLLEGE 498
By Clark L. Thayer, Head, Department of Floriculture, Massachusetts State College

CURRENT DISTRIBUTION FOR SCIENCE ROOMS IN HIGH SCHOOLS 499
By John A. Clark, Chairman of the Standing Committee on Science for the High Schools of New York City

PAGE

XI. Shop Planning and Equipment

THE COMPLETE VOCATIONAL ADJUSTMENT SERVICE OF THE THOMAS A. EDISON VOCATIONAL SCHOOL IN SEATTLE . . . 525
By Samuel E. Fleming, Assistant Superintendent, Public Schools, Seattle, Wash.

PURCHASING EQUIPMENT FOR THE INDUSTRIAL ARTS DEPARTMENT . . . 531
By Thomas A. Hippaka, Professor and Head of Industrial Education, Iowa State College

XII. Transportation Service

MAJOR DEVELOPMENTS IN THE TRANSPORTATION OF PUPILS . . . 551
By A. C. Lambert, Professor of Educational Administration, and Dean of the Summer School, Brigham Young University

XIII. College, University and Normal School Presidents . . . 567

XIV. Presidents of Junior Colleges . . . 575

XV. Heads of Private Schools . . . 579

XVI. Superintendents of Schools in Places of 5,000 Population and Over . . . 584

XVII. Superintendents of Catholic Parochial Schools . . . 593

XVIII. Aids Available to Local School Boards from State Departments . . . 595

XIX. Classified Index to Manufacturers' Products and Services . . . 605

INDEX TO ADVERTISERS . . . 619

Cumulative Index to Editorial Subjects

This index covers only the present Volume, XII (1940) and Volume XI (1939). A cumulative index to the previous Volumes, I through X, was published in Volume X.

A

Accounting, Child—XI, 343; XII, 368
Acoustical Planning—XII, 43, 307, 311, 441
Adaptability [See Flexibility]
Administrative Office [See Office]
Administrative Units—XII, 556
Adults, Provisions for—XI, 17, 19
Advertisers, Alphabetical List of—XII, 619
Advertisers, Classified Index to Products, XII, 605
Air-Conditioning Systems—XI, 37
Air View, Combined Elementary and High School Development—XI, 213
Air Views, Colleges and Universities—XI, 209, 213; XII, 180, 221
Air Views, High Schools—XI, 23, 209, 213
Apparatus, Laboratory [See Laboratory]
Aquaria—XI, 481
Archery Range—XII, 255
Architects' Fees—XII, 16
Architects for University and School Projects—XII, 169
Architectural Style—XII, 247, 432
Art Rooms—XII, 296
Association of School Film Libraries, Inc.—XI, 312
Athletic Facilities [See Fields, Athletic; Physical Education; Playgrounds; Recreation; Swimming Pool; Winter Sports Facilities]
Audio-Visual Aids—XII, 316
Auditoriums—XI, 304; XII, 25, 28, 46, 307, 313 [See also Stage]

B

Band-Practice Rooms—XII, 304
Baseball Field—XII, 219
Basketball Court—XII, 269
Bedrooms—XII, 424
Bibliography, Annotated, on School and College Buildings—XI, 52
Bibliography on Commercial Education Facilities—XI, 358
Bibliography on Industrial Arts Laboratory Planning and Equipment—XI, 518
Bibliography on Maintenance of Living Material in Biological Laboratories—XI, 485
Bibliography on Ski-Jump Construction—XI, 252
Bibliography on Ski-Tow Construction—XI, 258
Bibliography on Toboggan-Chute Construction—XI, 243
Bidding—XII, 18
Billing-Machine Classroom—XI, 354 [See also Commercial Classrooms]
Biology Laboratories—XI, 480; XII, 493 [See also Laboratory]
Blackboards [See Chalkboards]
Boiler-Room Equipment—XII, 33
Bookcases and Bookshelves—XI, 299
Bookkeeping Classrooms—XI, 354, 355; XII, 375 [See also Commercial Classrooms]
Books on Building and Equipment [See Bibliography]
Broadcasting Apparatus—XII, 298, 318
Building Costs—XII, 13
Building Programs [See Planning]
Business Training—XII, 373 [See also Commercial Education]
Bus Drivers—XI, 546
Buses—XI, 540; XII, 550
Bus Ownership Trends—XII, 552
Bus Routes—XI, 544; XII, 560
Bus Standards—XI, 540; XII, 554

C

Cabool Consolidated Schools, Texas County, Missouri—XII, 223
Cafeteria—XII, 26
Cafeteria-Counter Design—XII, 438
Cafeteria, Organization of Centralized Department—XI, 419
Cages, Animal—XI, 483
Campus Development and Upkeep—XI, 203; XII, 177, 217 [See also Grounds]
Carpenter Shop—XII, 181
Ceilings, Acoustical Treatment of—XII, 45
Census, School, Taking the—XII, 368
Chalkboards—XII, 294
Chemicals, Purchase of—XI, 472
Chemistry Laboratories—XI, 465; XII, 493 [See also Laboratory]
Child-Accounting Records—XI, 343; XII, 368
Choral Practice Rooms—XII, 304
Cincinnati, Ohio, Cooperative Recreation Program—XII, 256
City Planning and School Planning—XI, 21
Classroom Design and Equipment—XII, 24, 25, 30, 32
Classroom for Economic Geography—XI, 358
Classroom Supplies [See Supplies]
Classrooms, Acoustical Treatment of—XII, 45
Classrooms, College—XI, 288
Classrooms for Commercial Education [See Commercial Classrooms]
Classrooms for Home Economics Education [See Home Economics Classrooms]
Classrooms for Junior High Schools—XII, 293
Classrooms for Social Studies—XI, 292
Classrooms, Kindergarten—XI, 33
Cleaning, Vacuum—XI, 51
Cleveland Heights, Ohio, Centralized Cafeteria Department—XI, 419
Clothing Laboratory—XI, 424
College and University Facilities—XI, 18, 208, 236, 288, 409, 413, 465; XII, 49, 246, 265, 301, 375, 421, 438, 489, 496, 498 [See also Air Views; Floor Plans; Grounds Plans]
Color in Building—XI, 31, 298; XII, 24, 28
Commercial Classrooms and Departments—XI, 351, 353; XII, 373
Community-School Landscaping Program—XII, 203
Community Use of School Plant—XI, 17, 19, 25; XII, 40, 256, 313
Consolidated-School Libraries—XI, 297
Consolidation of Schools—XI, 24
Corkboards [See Display Boards]
Corridors—XII, 23, 29, 57, 60, 490
Costs, Heating and Ventilating—XI, 40
Costs, of Dormitories—XII, 378
Costs, School-Building—XII, 13
Cultures, Biological—XI, 484
Current Distribution, for Laboratories—XII, 499
Curriculum, Changing—XI, 17, 21, 288
Custodial Service—XI, 167; XII, 177

D

Dartmouth College, Ice-Hockey Rink—XI, 262
Depreciation—XI, 174
Design Types—XII, 14
Desks, Laboratory—XII, 497
Dining Facilities—XI, 412; XII, 424, 438 [See also Cafeterias]
Display Boards—XII, 294
Dog Stalls—XII, 494
Domestic Science [See Home Economics]
Dormitory Design and Equipment—XI, 409, 413; XII, 421
Dormitory Management—XI, 409; XII, 421
Downer's Grove, Ill., Community High School Development—XI, 205, 206
Drainage of Grounds—XI, 214
Dramatic Facilities [See Stage]
Drawing Classroom—XII, 532
Dressing Rooms—XII, 253, 264, 304
Drinking Fountains—XI, 47; XII, 27, 40
Drivers, Bus—XI, 546
Driveways—XI, 215
Duplicating-Machine Classroom—XI, 355 [See also Commercial Classrooms]

E

Eating Rooms [See Cafeterias; Dining Halls]
Economic-Geography Classroom—XI, 358
Economy in Construction—XII, 13
Edison Vocational School, Seattle, Wash.—XII, 525
Electrical Engineering Consultants for University and School Projects—XII, 62
Electrical Equipment—XII, 432, 499
Elementary-School Facilities—XI, 17, 31, 204; XII, 257, 258 [See also Air Views; Floor Plans; Grounds Plans]
Engineering Consultants, Mechanical and Electrical—XII, 62
English Rooms—XII, 47, 295
Enrolment Trends—XI, 16, 19
Entrances and Entrance Halls—XI, 32
Equipment, Classified Index to Manufacturers of—XII, 605
Equipment, List of Manufacturers of—XII, 619
Equipment Purchasing—XII, 182, 530

F

Family-Life Education [See Home Economics]
Fields, Athletic—XII, 217, 254
Filing-Practice Classroom—XI, 355 [See also Commercial Classrooms]
Filing Systems—XI, 346, 465
Film Libraries, Association of—XI, 312
Films, Sources of—XI, 312
Financing Building Program—XII, 56
Financing Institutions—XII, 19
Finishes, Interior—XII, 14
Fire Protection—XI, 51
Flexibility and Adaptability—XI, 26; XII, 23, 34, 51
Floor Maintenance—XI, 168; XII, 190
Floor Materials—XI, 509; XII, 294
Floor Plans, College and University—XI, 289; XII, 48, 49, 267, 302, 314, 315, 423, 424, 425, 426, 427, 428, 429, 431, 433, 495, 498
Floor Plans, Combined Elementary and High School—XI, 27; XII, 52
Floor Plans, Elementary School—XI, 27, 28, 29, 30; XII, 25, 56, 57, 60
Floor Plans, High School—XI, 354, 355, 356, 358, 424, 514, 515, 516, 517; XII, 30, 31, 44, 59, 302
Floor Plans, Junior College—XII, 309, 310
Floor Plans, Junior High School—XI, 39, 293; XII, 55, 295, 296, 297
Floor Plans, Junior-Senior High School—XII, 25
Floor Plans, Rural School—XI, 26; XII, 37, 38, 39, 52
Floor Plans, Typical Schools—XII, 15
Floor Plans, Vocational School—XII, 526, 527
Food Service, in Dormitories—XI, 412, 413; XII, 438
Food Service, in School Cafeterias—XI, 420
Foods Laboratory—XI, 424
Form for Bus Driver's Report—XII, 560
Form for Report of Testing Division—XII, 182
Form for Transportation-Route Survey—XI, 545
Forms for Audio-Visual Education Department—XII, 319
Forms for Cafeteria-Department Records—XI, 420
Forms for Child-Accounting Records—XI, 346; XII, 369, 370, 371, 372
Forms for Data on School Districts—XI, 347, 349
Forms for Data on Teaching Personnel—XI, 344, 346
Forms for Operation and Maintenance Department—XII, 179, 187
Forms for Quotations on Laboratory Apparatus—XI, 469, 470
Foundations as a Source of Financial Aid—XII, 19
Foyer—XI, 32
Fund Raising—XII, 20
Furniture Buying—XII, 183
Furniture, Dormitory—XII, 426
Furniture Library—XI, 302; XII, 312
Furniture Refinishing—XII, 186, 188

G

Geography, Economic, Classroom for—XI, 358
Glassware, Laboratory [See Laboratory]
Grade Schools [See Elementary Schools]
Grading of Grounds—XI, 214
Grammar Schools [See Elementary Schools]
Grants-in-Aid—XII, 20
Greenhouse Design and Equipment—XII, 498
Grounds, Landscaping of [See Landscape Design and Construction]
Grounds Plans, College and University—XI, 208, 210, 211; XII, 178
Grounds Plans, Consolidated Schools—XII, 223
Grounds Plans, Elementary School—XI, 27

Grounds Plans, High School—XI, 22, 204, 205; XII, 23
Grounds Plans, Teachers College—XI, 210
Grounds, Upkeep of—XII, 180, 190, 217
Gymnasiums—XII, 35, 246, 265

H

Handicapped Children, Provisions for—XI, 20
Heating and Ventilating Costs—XII, 16
Heating and Ventilating Systems—XI, 37; XII, 41, 181, 189, 430
Higher Education [See College and University]
High-School Facilities—XI, 17, 205, 206, 351, 353, 424; XII, 28, 47, 58, 224, 258, 259, 301, 311, 312, 373, 435, 499, 531 [See also Air Views; Floor Plans; Grounds Plans]
Hixon Laboratory for Medical Research, University of Kansas—XII, 489
Home Economics Classrooms and Departments—XI, 424; XII, 33, 435
Homemaking [See Home Economics]
Household Management [See Home Economics]

I

Ice-Skating Facilities—XI, 235, 259
Illumination [See Lighting]
Independent Schools [See Private Schools]
Industrial Arts Laboratories—XI, 508; XII, 33, 34, 531 [See also Shop]
Inspection, as part of Operation and Maintenance Program—XI, 171, 175; XII, 178, 185
Insulation, Sound—XII, 44
Interior Decorating—XI, 31
Inventory in School Cafeteria—XI, 420
Irrigation of Grounds—XI, 215

J

Janitorial Service [See Custodial Service]
Junior-College Facilities—XII, 308
Junior Colleges—XI, 17
Junior-High-School Facilities—XI, 292; XII, 293, 531 [See also Air Views; Floor Plans; Grounds Plans]

K

Kanawha County, W. Va., School-Building Program—XII, 54
Kansas, University of, Hixon Laboratory for Medical Research—XII, 489
Kindergarten Planning—XI, 33
Kitchens, Cafeteria—XII, 27
Kitchens in Dormitories—XI, 413; XII, 424
Kitchens in Home Economics Departments—XI, 425; XII, 436

L

Laboratory Apparatus and Supplies, Acquisition and Care of—XI, 465
Laboratory, Biological, Care of Living Material in—XI, 480
Laboratory, Home Economics [See Home Economics Facilities]
Laboratory, Industrial Arts—XI, 508
Laboratory Planning and Equipment—XI, 289, 465; XII, 32, 489, 496, 499
Laboratory Servicing—XI, 465
Laboratory, Social Studies—XI, 294
Laboratory Storage Rooms—XI, 478
Landscape Architects for University and School Projects—XII, 226
Landscape Design and Construction—XI, 203; XII, 181, 217, 223
Language Rooms—XI, 291; XII, 296
Lansing, Mich., Thomas Street School—XI, 31
Laundry of Laboratory Glassware—XI, 476
Lavatories—XI, 47; XII, 27
Lecture Room—XI, 290; XII, 494
Lexington, Ky., Maintenance Organization—XI, 166
Library Planning—XII, 26, 254, 296, 492
Library Planning, for Consolidated Schools—XI, 297
Library Planning, for Junior Colleges—XII, 308
Lighting, by Skylight—XI, 42
Lighting, Classroom—XII, 293
Lighting, Library—XII, 311
Lighting, Stage—XI, 307
Living Rooms, for Homemaking Classes—XII, 437
Living Rooms, in Dormitories—XI, 410
Lobby—XII, 268
Location of Educational Buildings [See Site Selection]
Locker Rooms, Gymnasium—XII, 253, 266, 269
Lockers—XI, 169; XII, 304
Los Angeles, Calif., Maintenance Program—XI, 174
Lunch Rooms [See Cafeterias]

M

Machine Shops—XII, 490, 533
Maintenance of Buildings and Grounds—XI, 24, 171, 174; XII, 177, 185, 217
Maintenance Organization in a Medium-Size School System—XI, 166
Manual Training [See Industrial Arts; Vocational Education]
Manufacturers, Alphabetical and Classified Lists of—XII, 605, 619
Massachusetts State College—XII, 496, 498
Mathematics Suite—XI, 289
Mechanical Engineering Consultants for University and School Projects—XII, 62
Medical Research Laboratory—XII, 489
Menu Planning—XI, 421
Motion Pictures, Films Available—XI, 312
Multiple-Use Provisions—XI, 26; XII, 51
Music Rooms—XII, 46, 297, 301

N

Natural Lighting—XII, 293 [See also Lighting]
Neighborhood Planning and School Planning—XI, 20
New York State, Typical School Buildings in—XII, 17
North Carolina, University of, Gymnasium—XII, 265
Nursery School—XII, 35

O

Office-Practice Classrooms—XI, 354; XII, 378 [See also Commercial Education]
Office, Administration—XI, 36; XII, 26
Offices, for Physical Education Department—XII, 248
Operating Statement, Monthly, for School Cafeteria—XI, 423
Operation and Maintenance—XI, 166, 171, 174; XII, 177, 185
Orchestra Practice Rooms—XII, 303

P

Painting—XII, 186
Panels, Electric—XII, 499
Paving—XII, 218
Penmanship Classroom—XI, 357
Personnel [See Custodial Service; Teachers]
Physical-Education Facilities—XI, 235, 240, 244, 248, 254, 259, 265; XII, 34, 217, 246, 256, 261, 265
Physical Education for Women—XII, 246
Physics Laboratories—XII, 499
Physiological Laboratories—XII, 491, 496
Piping, Gas—XI, 50
Piping, Water—XI, 50
Planning, as related to Construction Costs—XII, 13
Planning Building Programs—XI, 13, 19, 24; XII, 13, 22, 36, 51, 54
Planning, Coordination of City and School System—XI, 21; XII, 256
Playgrounds—XII, 257, 258, 259
Plot Plans [See Grounds Plans]
Plumbing—XI, 46, 410; XII, 16, 27, 189, 430
Population Trends—XI, 13, 19
Preparatory Schools [See High Schools; Private Schools]
Primary Schools [See Elementary Schools]
Princeton University, Frick Chemical Laboratory—XI, 465
Principal's Office—XI, 36
Print Shop—XII, 533
Private-School Facilities—XI, 237; XII, 218, 219, 222
Programs for School Building and Site Selection [See Planning]
Project Room—XI, 291
Public-Address Systems—XII, 298, 318
Publications on Building and Equipment [See Bibliography]
Public-School Facilities—XI, 237 [See also High School; Elementary School]
Purchasing for Cafeteria Department—XI, 420
Purchasing for Industrial Arts Department—XII, 531
Purchasing Laboratory Apparatus and Supplies—XI, 465
Purchasing Supplies and Equipment—XII, 182
P.W.A. Construction—XII, 18, 58

R

Radio Facilities—XII, 298, 318
Recitation Rooms [See Classrooms]
Reconditioning and Remodeling—XI, 169; XII, 61, 185
Record Systems for Child Accounting—XI, 343; XII, 368
Records for Cafeteria Department—XI, 422
Recreation, Cooperative Organization of, in Cincinnati, Ohio—XII, 256
Recreation Facilities—XI, 235, 240, 244, 248, 254, 259, 265; XII, 246, 256, 261, 265
Repair Department—XI, 167; XII, 179, 185
Research Laboratories—XII, 489
Residence Halls [See Dormitories]
Rinks, Ice-Skating—XI, 259
Roads—XI, 215
Roof Maintenance—XII, 186
Routes, Bus—XI, 544; XII, 560
Rural Schools—XI, 17, 24; XII, 36, 51, 54, 223

S

Salvaging Materials and Equipment—XI, 169, 178; XII, 61
Science Laboratories—[See Laboratory]
Seattle, Wash., Thomas A. Edison Vocational School—XII, 525
Secondary Schools [See High Schools; Junior High Schools]
Seminar Room—XI, 291; XII, 494
Servicing Laboratories—XI, 465
Sewing Room—XI, 424
Shelving, Library—XI, 299
Shop Layouts and Equipment—XI, 508; XII, 33, 34, 525, 531
Shops, Repair—XII, 181
Shower Facilities—XI, 47; XII, 253, 263, 268
Shrubs—XII, 220
Sinks, XI, 47
Site Costs—XII, 18
Site Selection and Planning—XI, 204; XII, 22, 43
Skating, Ice [See Ice Skating]
Ski Jumps, Construction of—XI, 248
Ski Shelters and Lodges—XI, 265
Ski Tows, Construction of—XI, 254
Ski Trails, Construction of—XI, 238, 244
Skylighting—XI, 42
Small Schools—XII, 51
Snow Sports [See Winter Sports]
Social-Studies Classrooms—XI, 292
Sound Control [See Acoustical Planning]
Specifications, for Supplies and Equipment—XII, 182
Sports [See Physical Education; Recreation]
Stage Design and Equipment—XI, 304; XII, 26, 313
Stairways and Stairwells—XI, 33
Stamford, Conn., Record-Keeping System—XII, 368
Standards for Transportation Service—XI, 540, 549; XII, 554
State Responsibility for Transportation Service—XI, 548; XII, 552, 554
Steamfitting—XII, 189
Structural Types—XII, 14
Student-Forum Unit—XI, 289
Student Records [See Child Accounting]
Studies—XII, 424
Subsidizing, by Foundations—XII, 19
Summer Renovation Program—XII, 185
Supply Purchasing—XII, 182
Swimming Pools—XII, 35, 250, 261, 270

T

Tables, Laboratory—XII, 496
Teachers, Records on—XI, 344, 346
Temperature Control—XI, 37
Tennis Courts—XII, 218
Terraria—XI, 483
Testing, as Part of Purchasing Procedure—XII, 182
Texas County, Missouri—XII, 223
Texas, University of, University Junior High School—XI, 292
Theaters—XI, 309 [See also Stage]
Toboggan Chutes, Construction and Care of—XI, 240
Toilet Facilities—XI, 46; XII, 27, 263
Track—XII, 219
Transportation Service—XI, 539; XII, 551
Trees, Care of—XII, 180, 220
Tulsa, Okla., Will Rogers High School—XII, 28
Turf Areas—XII, 217
Typing Classrooms—XI, 356; XII, 376, 377 [See also Commercial Education]

U

United States Military Academy, Ice-Skating Rink—XI, 262

Universities [See Colleges]
Upkeep [See Maintenance]
Urinals—XI, 47
Utilization—XII, 14, 23

V

Vacuum-Cleaning System—XI, 51
Ventilating Systems—XI, 37; XII, 16, 189
Ventilation, Toilet-Room—XI, 46
Visual-Education Facilities—XI, 312; XII, 316
Vocational Adjustment Service—XII, 525
Vocational School Design and Equipment—XII, 525

W

Walks—XI, 215; XII, 218
Walls, Acoustical Treatment of—XII, 45
Wardrobes—XII, 426
Washington and Lee University, Buildings and Grounds Maintenance—XII, 177
Water Closets—XI, 47; XII, 27
Water Supply—XI, 47
West Point, N. Y., Ice-Skating Rink at United States Military Academy—XI, 262
West Virginia, Kanawha County's School-Building Program—XII, 54
Windows—XII, 24
Winnetka, Ill., Home Economics Department of New Trier Township High School—XI, 424
Winter Sports Facilities—XI, 235, 240, 244, 248, 254, 259, 265
Winter Sports, Place of in Physical-Education Program—XI, 236
Wisconsin, State School Building Service—XII, 36
Wisconsin, University of, Theatre and Arts Addition—XII, 48, 49
Woodwork Shop—XII, 181, 532

Index to Authors

This index covers only the present Volume, XII (1940) and Volume XI (1939). A cumulative index to authors in Volumes I through X was published in Volume X.

Baldwin, J. W.—XI, 292
Barrows, Alice—XII, 313
Briggs, Lawrence E.—XI, 248
Broady, Knute O.—XII, 51
Bursch, Charles—XI, 24

Carr, William G.—XI, 13
Clark, John A.—XII, 499
Cornwell, Oliver K.—XII, 265
Corrington, Julian D.—XI, 480
Courter, C. V.—XII, 256
Crawford, C. L.—XI, 171

Desmond, Thomas H.—XII, 217
Douglas, Mary Peacock—XI, 297

Early, Doyt—XI, 24
Ebey, George W.—XI, 304
Engelhardt, N. L.—XI, 19
Engelhardt, N. L., Jr.—XII, 13
Ernst, Joseph L.—XII, 182

Farnam, Mary—XI, 419
Fetzer, R. A.—XII, 265
Fleming, Samuel E.—XII, 525
Foulk, W. B.—XI, 465
Fowlkes, John Guy—XI, 343
Freegard, Ruth—XII, 435

Gage, George E.—XII, 496
Given, John N.—XI, 351
Gore, Harold M.—XI, 235

Hacker, Ralph E.—XII, 293
Haegerty, Frank—XII, 223
Hamon, Ray L.—XI, 42
Hardesty, Cecil D.—XII, 308
Harrison, Wallace K.—XI, 288
Herr, Ben B.—XI, 166
Hill, Chance S.—XI, 203
Hippaka, T. A.—XII, 531
Hoban, Charles F., Jr.—XI, 312
Hollis, Ernest V.—XII, 19
Holmes, Warren S.—XI, 31
Houston, Ruth E.—XII, 246
Hoy, W. W.—XII, 223
Hunter, Melissa—XI, 409

Ickes, Harold L.—XI, 5

Jardine, Alex.—XII, 316
Joyner, S. C.—XI, 174

Konarski, M. M.—XII, 54
Kunkel, Robert F.—XI, 42

Lambert, A. C.—XII, 550
Lamp, Charles J.—XII, 301
Leggett, Stanton—XI, 52
Leuhring, F. W.—XII, 261
Lewis, Samuel R.—XI, 37
Lighter, Jane Winter—XI, 424

Manley, C. B.—XII, 28
Maxfield, J. P.—XII, 43
Mitchell, Walter Kimball, Jr.—XI, 265
Morphet, Edgar L.—XI, 539

Park, R. H.—XII, 185
Potwin, C. C.—XII, 43
Putnam, Paul S.—XI, 254

Scherer, F. R.—XII, 298
Schmidt, Hans W.—XII, 36
Simonson, Lee—XII, 313
Slocum, Chester A.—XI, 46
Smith, Howard Dwight—XII, 421
Snow, Russell L.—XI, 259
Snow, Samuel P.—XI, 240
Staples, Leon C.—XII, 368
Stoneman, Merle A.—XII, 51
Stripling, James A.—XII, 22
Studebaker, M. E.—XII, 373

Taylor, Albert D.—XI, 203
Terrell, Margaret E.—XI, 413
Thayer, Clark L.—XII, 498
Tonne, Herbert A.—XI, 353

Veech, J. Alexander—XII, 177
Vincent, Robert—XI, 244

Wahl, H. R.—XII, 489
Webber, Owen—XII, 438
Whitehead, Willis A.—XI, 508
Whitford, B. Frank—XII, 368

SECTION I
BUILDING COSTS AND FINANCING

SCHOOL-BUILDING COSTS

By N. L. ENGELHARDT, Jr.

Research Assistant, Institute of Educational Research, Teachers College, Columbia University

THE average annual capital outlay expenditure for public schools in the United States between 1932 and 1936 was $147,000,000. Prior to this depression period these expenditures exceeded $370,000,000. Such expenditures are directed by lay members of boards of education. These boards in turn rely to a large extent on the advice of architects who usually have not had professional educational training. Few members of the boards are involved in the construction of school buildings more than once during their public careers, and few are acquainted with the many complex problems associated therewith. Board members may readily be misdirected in their efforts because of their lack of construction experience as well as the lack of educational experience on the part of the architects. Students of school-building problems have felt for some time that these conditions have led to waste in construction. The recognition of each particular problem and its solution are matters of considerable importance financially. Research and study are needed to give direction to board members and architects and to make possible the wisest expenditure of public funds.

Research Needed for Guidance

There can be little doubt as to the desirability of local autonomy in school-plant planning. This is a part of our democratic form of government and must be maintained. It is clear that under this form of local participation a certain amount of inefficiency is to be expected, but standardization and stagnation are prevented. Individual tastes are cultivated and allowed to express themselves, resulting in reasonable differences in plant design among communities which may be promoting similar educational programs. There has been little research, however, by which lay participants can be guided in avoiding costly mistakes in planning which fall outside the realm of mere differences in tastes or opinions. This is especially true in the field of school-building costs. Architects are in general unable to give satisfactory answers to questions concerning the costs of many factors entering into design. School-board members act blindly in many situations because past experience has not been made available to them.

Wasteful Planning

The usual procedure in planning a building is to set a price and give the architect a statement of the number and type of rooms desired. The architect then attempts to match cost and needs. A plan is presented to be revised or accepted by the board. The architect chooses materials and designs which he believes are desirable. His choice may or may not be based upon educational need. The school board accepts a design without realizing that the factors which largely influence the cost of the building are contained in these preliminary drawings. Comparisons are made on a cost per cubic foot basis without any analysis of the utilization of the space.

The result of this type of planning may be quite wasteful. Cheap materials which deteriorate rapidly may be used on the interior to offset the expense of an impressive exterior elevation, or unnecessarily expensive materials may be used merely because the community budget allows the architect to spend extravagantly. The cubic foot cost may have been brought to a ridiculously low figure merely by increasing the attic space or using a particular formula for determining cubic contents. The allocation of space for corridors, stairs, administration, instructional units, or general units may be excellent, or very uneconomical, but in either case it may be largely a factor of chance rather than the result of deliberate planning for efficiency.

During the past two years considerable research has been initiated in an attempt to establish certain criteria for economical school-building construction. The effort was made to determine the principal factors in design and construction that influenced the cost of buildings.[1] One of the most important find-

1 "School Building Costs," by N. L. Engelhardt, Jr.—Bureau of Publications, Teachers College, Columbia University, New York, 1939.

ings of this research showed that for 52 New York State buildings the cost per cubic foot was inversely related to economical construction when types and materials of construction were held constant for all the buildings. In other words, the total amount of money paid for each of two buildings housing the same educational program and the same number of children was greater for the one with the lowest cost per cubic foot. This study laid emphasis on the necessity for a complete analysis of the building design and materials of construction in order to insure economy. Comparisons of buildings on the basis of cost per cubic foot should be avoided by school-board members who are unfamiliar with the many factors which influence this unit of measure.

In this same study many variations in costs were attributable to variations in designs and materials which apparently had very little relationship to the educational needs. Some of the most expensive designs were obviously contrary to desirable practice. For example, buildings in which auditoriums were placed on the second floor above gymnasiums cost 1.2 cents per cubic foot more than buildings in which these units were both located at ground level. There is little question but that the cheaper of these two arrangements is by far the more acceptable from an educational point of view.

Types of Plans

The design of the building is one of the most important factors influencing cost. Design can be mathematically measured by the relations of perimeter and ground area to cubic contents. In an analysis of these relationships it was found that the ratio of perimeter to cubic contents was twice as important as the relation of ground area to cubic contents in determining costs. Differences of as much as 10 cents per cubic foot were attributable to these factors. At the time of planning these buildings important savings could have been made, or the building enlarged at no additional cost, had these factors been considered and the designs revised when it appeared that they were uneconomical.

The importance of these ratios is made clear by a very simple example. Consider a square 8 feet on a side. The perimeter is 32 feet. The ground area is 64 square feet. Thus, ½-foot of perimeter or exterior wall is required to enclose 1 square foot of ground area. Now if this square is divided into two smaller equal squares which might correspond with the floors of a two-story building, they would be approximately 5.6 feet on a side with a ground area of 32 square feet each and a perimeter of 22.6 feet each. Therefore, 45.2 feet of perimeter would be required to enclose 64 square feet of ground area, or .7-foot per square foot compared with .5-foot per square foot in the one-story plan. From the point of view of the cost of exterior wall, it is obvious that the one-story building is cheaper than the two-story building when the buildings are square. This type of analysis was carried out for the 52 buildings included in the previously mentioned study, and exact variations determined for 20 types of plans, together with formulae for estimating costs from perimeter, ground area, and cubic contents. Ten of these plan types are reproduced on the opposite page.

Types of Structures

In New York State all available evidence indicates that steel skeleton frame buildings are cheaper than wall-bearing buildings. The difference in cost was found to be approximately 2 cents per cubic foot. A study conducted in St. Louis [2] indicated even greater differences in favor of concrete skeleton frame buildings. Whether or not this is true for all sections of the country is of course open to question. But this type of analysis certainly should be carried out in every state to assure a maximum return for every school-building dollar.

A study of types of roof construction in relation to cost favored slightly the wood-frame gable or hip roof over the steel frame concrete or gypsum-slab flat roof. However, this saving can be voided by the use of high gables or large attics which result in a large amount of non-habitable cubic contents.

Interior Finishes

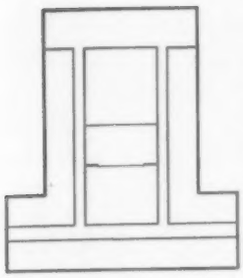
Variations in interior finishes may account for as much as 4 cents per cubic foot differences between buildings. However, it is difficult to match this finding with economy in construction since there has been very little research to date on the question of maintenance and depreciation of different types of finishes. Buildings with terrazzo corridor floors, maple in classrooms and gymnasiums, cork wainscoting, and acoustic ceilings are of course more expensive than those using linoleum throughout and plaster ceilings. It is entirely possible, however, that maintenance costs may more than offset the savings in initial outlay. There is here a place for extensive future research and study, which should result in significant aids to economy.

Functional Distribution of Spaces

The cost per cubic foot of a building may be low, but the total cost may be excessive because of the small amount of space devoted to educational purposes. Many writers have called attention to the desirability of the elimination of waste by careful and efficient planning. There is probably no other

[2] Strayer, G. D., Engelhardt, N. L., et al.—A Report of a Survey of the Public Schools of St. Louis, Mo. Bureau of Publications, Teachers College, Columbia University, 1939.

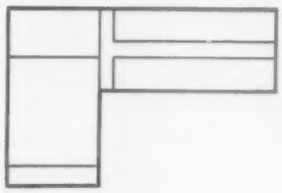
Plans and Characteristics of Typical School Buildings



Plan Type A

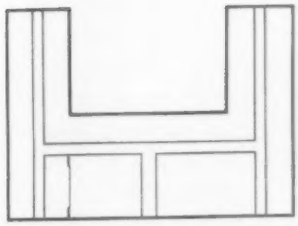
Service basement and two floors
Flat roof
Ratio of ground area to perimeter = 39.5 *
Estimated cost per cubic foot = 20.7 cents

* The ground area of this building was 30,000 square feet; the perimeter, 760 linear feet; and the ratio of ground area to perimeter, 30,000 ÷ 760, or 39.5.



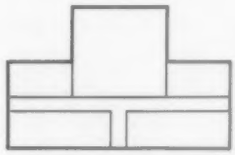
Plan Type F

Service basement and three floors
Flat roof
Ratio of ground area to perimeter = 26.1
Estimated cost per cubic foot = 23.6 cents



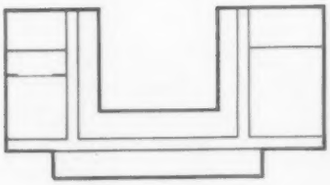
Plan Type B

Service basement and two floors
Flat roof
Ratio of ground area to perimeter = 36.2
Estimated cost per cubic foot = 21.6 cents



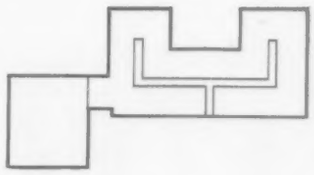
Plan Type G

Full basement and two floors
Flat roof
Auditorium located above gymnasium
Ratio of ground area to perimeter = 21.6
Estimated cost per cubic foot = 24.4 cents



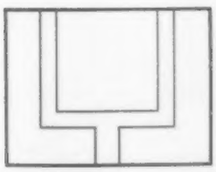
Plan Type C

Service basement and two floors
Flat roof
Ratio of ground area to perimeter = 28.1
Estimated cost per cubic foot = 22.9 cents



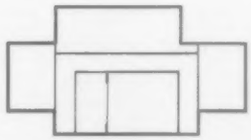
Plan Type H

Service basement and two floors
Hip roof
Ratio of ground area to perimeter = 20.3
Estimated cost per cubic foot = 24.8 cents



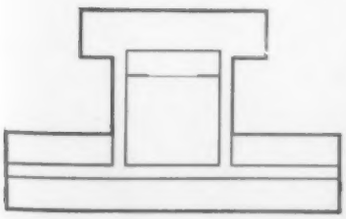
Plan Type D

Full basement and two floors
Flat roof
Auditorium located above gymnasium
Ratio of ground area to perimeter = 28.4
Estimated cost per cubic foot = 23.1 cents



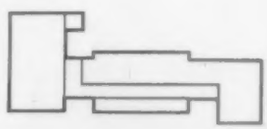
Plan Type I

Service basement and one floor
Flat roof
Ratio of ground area to perimeter = 16.6
Estimated cost per cubic foot = 27.8 cents



Plan Type E

Service basement and three floors
Flat roof
Ratio of ground area to perimeter = 26.2
Estimated cost per cubic foot = 23.4 cents



Plan Type J

Service basement and one floor
Gable roof
Ratio of ground area to perimeter = 13.1
Estimated cost per cubic foot = 31.0 cents

phase of school-building design and construction which bears so much upon cost as does the allocation of spaces to secure a maximum percentage of the total cubic contents for educational use.

In the recent study of costs in New York State it was found that space devoted to attics, walls, plenum chambers, ducts, and other non-habitable areas cost 16 cents per cubic foot, space devoted to auditoriums and gymnasiums cost 34.3 cents per cubic foot, and other habitable spaces cost 23.6 cents per cubic foot. It was also found that the amount of non-habitable space ranged from 16.5 to 47.4 per cent of the total cubic contents of the building, with an average of 32.4 per cent for all buildings. This indicates that in many cases more than one-third of the total cubic contents is not usable and yet costs approximately 16 cents per cubic foot. It is interesting to note that on the average only 41.5 per cent of the total cubic contents was devoted to instructional and general educational units. The indications were that certain architects designed buildings with higher percentages of educational space than others. Much of the burden for the development of economy in this area is upon the architect, but the educational staff should certainly be prepared to check designs in order that there may be a minimum of waste.

The table on the opposite page shows the distribution of spaces in 52 New York buildings.

Heating and Ventilating

Heating and ventilating costs represent approximately 13 per cent of the total cost of the four major contracts in New York schools. Of this amount, approximately 3 per cent is chargeable to mechanical unit ventilators. There is probably no other single part of a school building which has met with as much criticism as the ventilating system. Ventilating engineers and scientists who have studied ventilation requirements in schools are practically unanimous in suggesting the elimination of state-wide uniform ventilation requirements. With the cost of providing 30 cubic feet of air per pupil per minute exceeding 3 per cent of the total cost of the building, every effort should be made to erase these requirements from the laws and to establish ventilation needs in terms of local conditions.

Other factors which influence the cost of heating and ventilating include the ratio of perimeter to cubic contents, and the ratio of ground area to cubic contents. The first of these ratios is the more important, and the second ratio is related inversely to cost. Thus, the more ground area, the lower the cost of heating and ventilation if cubic contents are constant. Also, as is quite obvious, the fewer linear feet of perimeter required per cubic foot, the lower the cost. Another factor which is about one-third as important as these ratios is the percentage of habitable space provided.

Plumbing and Electrical Costs

Both plumbing and electrical work represented approximately 5.6 per cent each of the total cost of the four major contracts. The cost per cubic foot for plumbing was found to be 1.7 cents, and for electrical work 1.8 cents, both with a standard deviation of .5-cent. The major factor influencing costs in both cases was equipment, but it is clear that no large economies can be found in these services, since the variations are so small. Certainly, general construction costs vary so widely that real economy should be sought there before handicapping the plumbing and electrical services.

Other Factors Related to Costs

Although the expenditures under the four major contracts—general construction, heating and ventilating, plumbing, and electrical work—make up the largest part of the school-building cost, there are many other factors which are very important. Among these are included architectural fees, competitive bidding and contracting, PWA, site, and site-development costs.

Architectural Services

The American Institute of Architects has established standard fees that architects may charge for design and construction services. However, it was found in New York State that these standards were not adhered to by all architects. Fees paid to architects ranged from 4.5 to 8.5 per cent of the total cost of the four major contracts. Certain architects consistently charged as low as 5 per cent, while one architect maintained an average of 6.8 per cent on all his buildings. It is questionable whether it is possible to secure the right kind of architectural services by reducing payment to a point below 6 per cent. It is also doubtful whether there is any justification for fees higher than 6 per cent, since even the very best architects do not demand more than 6 per cent on buildings costing as much as the schools which were studied. On the other hand, many architects whose buildings were studied used similar plans for two or more projects. It does not seem reasonable to pay for designing when a design has been standardized. Architects utilizing standard plans should certainly be required to reduce their charges for architectural services. It is, however, even more questionable whether it is desirable to utilize standard plans. Certainly, there can be no integration with community life when a building designed to meet the needs of one situation is superimposed upon a totally different environment. The standardized plan appears to be largely a matter

Building Number	Percentage of Total Habitable Space Assigned to Various Functions																			Percentages Habitable and Nonhabitable Spaces Are of Total Cubic Contents		
	Building Service					Administration, Staff, and Pupil Service					Instructional Units				General Units							
	Heating and Ventilating	Circulation	Storage	Garage	Total	Offices	Staff	Pupil	Cafeteria	Total	Classrooms	Laboratories and Shops	Library and Study Hall	Total	Auditorium	Gymnasium	Assembly Room	Combination Auditorium-Gymnasium	Total	Grand Total	Habitable Space	Nonhabitable Space	Grand Total
ELEMENTARY SCHOOL BUILDINGS																							
1	10.6%	14.8%			25.1%	1.3%	2.9%	2.7%		6.9%	34.2%			34.2%				33.6%	33.6%	100%	57.0%	43.0%	100%
2	14.6	15.1	0.2%		29.9		2.1	4.4		6.5	32.3			32.3				31.3	31.3	100	64.5	35.5	100
3	7.7	16.9	7.7		32.3	0.7	0.8	5.8	1.2%	8.2	28.5			28.5				33.0	33.0	100	57.5	42.5	100
5	10.5	15.4	1.0		26.9	4.8	0.4	6.0		15.2	37.7		8.4%	46.1				16.8	16.8	100	63.2	36.8	100
7	6.2	17.8	10.2		34.2	2.0	2.0	5.4	1.8	9.2	31.7			31.7				34.9	34.9	100	52.6	47.4	100
11	5.9	25.8	2.0		33.7	5.9	2.8	6.4		14.6	43.8	1.8%		45.6			6.1%		6.1	100	60.0	40.0	100
15	7.7	18.4	3.8		29.9	5.8	0.4	7.4	3.5	15.1	25.3		2.7	27.0				28.0	28.0	100	60.1	39.9	100
29	8.8	16.5	2.5		26.8	2.1	1.4	7.7	3.1	14.3	25.3	2.4	1.9	29.2				29.7	29.7	100	61.4	38.6	100
Means					29.1%					10.4%				33.9%					25.5%	100%	59.5%	40.5%	100%
SECONDARY SCHOOL BUILDINGS																							
17	5.4%	10.1%	2.1%		26.0%	1.2%	0.9%	6.0%	4.0%	12.1%	13.2%	11.9%	4.0%	29.1%			1.2%	31.8%	32.8%	100%	66.5%	33.5%	100%
26	3.9	20.4	4.5		28.8	1.3	1.5	8.0	3.3	12.9	11.4	12.4	6.5	30.3				27.0	27.0	100	63.6	36.4	100
34	4.1	18.6	3.4		26.1	2.7	2.2	4.7		9.6	26.0	15.7	2.2	43.9		19.4%	4.0		23.4	100	56.2	43.8	100
45	9.0	14.8	10.1		33.9	4.1	1.7	9.1	4.7	19.6	10.8	6.4	4.9	22.1		24.4			24.4	100	64.3	35.7	100
46	4.8	19.6	2.9		27.3	1.5	1.0	6.4	4.3	15.2	15.8	12.3	3.3	29.4	16.2%	11.4	0.5		28.1	100	65.3	34.7	100
47	6.4	12.8	3.1		22.3	3.1	0.8	8.8	3.5	16.2	12.8	10.7	3.8	27.3	17.8	16.7			34.2	100	66.5	33.5	100
Means					26.9%					14.4%				30.4%					28.3%	100%	65.4%	34.6%	100%
COMBINATION ELEMENTARY AND SECONDARY SCHOOL BUILDINGS																							
4	6.6%	13.7%			20.2%	0.8%	0.8%	5.9%		7.5%	26.0%	13.4%	2.3%	41.7%				30.8%	30.8%	100%	68.0%	32.0%	100%
6	11.6	16.5	0.8%		28.4	3.5		7.8	0.6%	11.7	20.3	12.4	5.8	38.5				21.4	21.4	100	67.5	32.5	100
	4.6	10.2	0.4		15.2	1.2	0.9	4.8	2.4	9.3	17.4	10.4	5.4	33.2	18.0%	24.5%			42.5	100	63.5	16.5	100
9	7.8	18.7	3.4		26.6	1.8	0.8	5.6	2.9	10.8	21.3	9.1	4.9	35.3				27.3	27.3	100	74.5	25.5	100
10	6.0	13.3	0.8		19.8	1.0	1.5	5.2	2.8	10.2	19.8	9.4	6.7	31.9				30.1	30.1	100	76.0	24.0	100
12	7.4	13.7			21.1	1.8	0.8	6.8		9.4	29.4	12.4	5.2	41.0				28.5	28.5	100	67.5	32.5	100
13	5.9	15.8	2.1		23.8	2.1	0.6	5.5	5.5	13.5	26.0	10.5	4.6	40.9				22.5	22.5	100	74.5	25.5	100
14	5.7	11.9	2.4		20.0	2.7	1.5	11.0	3.2	18.2	19.1	9.1	5.4	33.6				31.2	31.2	100	73.8	26.2	100
16	6.3	17.8	3.2		27.3	1.3	0.1	8.4	0.4	7.2	26.8	8.4	5.3	33.5				32.0	32.0	100	66.5	34.5	100
18	4.8	17.8	0.9		22.9	2.1		5.2	3.3	10.6	19.8	9.4	5.8	35.0				31.5	31.5	100	70.5	29.5	100
19	4.2	18.2	0.9	3.2%	23.5	2.6	1.2	5.4	2.6	9.8	17.7	9.4	4.1	31.2	16.5	19.0			35.5	100	75.5	24.5	100
20	6.3	17.1	1.5		25.9	2.1	1.2	9.1	2.9	15.3	6.6	22.2	5.0	33.8		27.0			27.0	100	54.6	45.4	100
21	4.1	17.9	5.4		27.4	1.7	0.6	7.6	4.0	13.9	19.7	10.4	3.1	33.4				25.3	25.3	100	75.8	24.2	100
22	5.9	19.1	1.1		26.1	2.1	1.1	6.3	3.4	12.9	26.0	8.2	2.8	37.0				34.0	34.0	100	79.2	20.8	100
23	8.2	19.6	2.9		27.7	3.7	0.9	6.6	2.5	13.7	21.1	7.0	4.4	32.5				26.1	26.1	100	71.5	28.5	100
24	4.4	17.1	3.7		25.2	3.2	0.5	2.8	4.3	10.6	22.9	8.3	3.8	35.0				29.2	29.2	100	64.6	35.4	100
28	4.9	21.3	3.4		29.6	3.0	0.4	7.3	3.8	14.5	21.7	8.9	2.9	33.5				22.4	22.4	100	66.0	34.0	100
26	6.5	18.3	2.3		26.1	2.3	0.1	9.0	6.6	18.0	25.4	8.2	2.5	36.1				21.8	21.8	100	66.3	33.7	100
27	4.2	20.7	4.1	2.7	31.7	1.5	0.6	5.0	2.1	9.2	12.1	8.8	2.5	23.4			1.0%		37.7	100	68.0	32.0	100
38	9.1	21.3	0.8	2.9	34.1	2.6	0.1	4.0		6.7	23.2	6.7	2.2	32.1					27.1	100	75.0	25.0	100
30	6.9	16.7	2.2		25.8	1.8	0.1	9.9	2.8	14.4	25.5	9.2	3.8	38.5					21.3	100	66.3	33.7	100
31	5.6	16.6	1.7		23.9	2.8	1.7	6.0	4.0	14.5	27.0	10.0	4.8	41.8					19.8	100	65.5	34.5	100
32	11.5	12.3	2.9	2.9	29.6	3.2	1.9	4.6	1.9	11.6	14.9	9.5	4.5	28.9			0.8		29.1	100	64.4	35.6	100
33	6.7	16.5	2.0	6.7	31.9	2.7	0.9	8.5	3.6	15.7	21.5	7.3	2.2	31.0					21.4	100	65.3	34.7	100
34	7.4	20.1	5.5		33.0	2.1	1.1	5.3	2.3	10.8	20.6	10.0	2.1	32.7					23.5	100	74.5	25.5	100
37	5.9	21.8	5.2		32.9	2.5	1.8	6.2	2.5	13.0	9.9	15.3	5.0	28.2	16.5	9.4			25.9	100	68.2	31.8	100
38	4.9	19.5	1.4		25.8	3.1	1.3	4.1	2.5	11.0	23.9	6.6	3.7	34.2	17.1	11.9			29.0	100	69.0	31.0	100
39	2.5	15.3	1.8	3.1	22.7	2.2	0.8	5.1	2.0	10.1	19.5	11.9	3.5	34.9	14.5	16.7	1.5		32.5	100	66.2	33.8	100
40	6.1	16.3	3.3		25.7	2.3	0.8	9.4	3.6	16.1	23.6	10.5	2.4	36.5				21.7	21.7	100	67.5	32.5	100
41	2.1	19.7	1.5		23.3	2.4	0.7	3.4	2.2	8.7	21.9	12.0	3.1	37.0	17.4	15.6			31.0	100	75.0	25.0	100
42	8.3	14.3	1.5		24.1	2.8	0.6	4.9	2.1	10.4	20.4	9.7	2.9	33.0	16.4	13.1	1.0		32.5	100	83.5	16.5	100
44	4.1	19.2	3.5		26.8	2.2	1.3	5.0	3.9	12.4	24.6	10.6	3.3	38.5				22.3	22.3	100	69.0	31.0	100
45	4.6	17.8	3.3		25.7	1.9	3.7	5.5	4.0	15.1	24.4	7.1	3.4	34.9	13.9	10.4			24.3	100	62.2	37.8	100
48	1.8	13.5	1.2		16.5	2.4	0.7	6.5	2.4	12.0	25.7	8.2	3.6	37.5	16.5	16.3	1.4		34.0	100	73.5	26.5	100
49	5.8	18.8	2.5		26.8	2.8	1.9	5.5	2.2	12.4	22.0	9.5	2.9	34.4	12.7	13.7			26.4	100	66.0	34.0	100
50	5.3	12.1	2.9	6.6	26.9	1.5	1.1	4.2	3.4	10.2	23.6	7.6	2.3	33.5	16.6	15.3	0.5		29.4	100	76.8	23.2	100
51	9.1	14.8	2.2	5.2	31.3	2.1	1.1	5.8	2.7	11.7	20.6	7.8	2.8	31.2	14.0	11.1	0.7		25.8	100	69.6	30.4	100
52	9.1	17.0	4.1		30.2	2.0	1.5	8.2	2.1	13.8	16.7	9.0	3.6	29.3	11.3	13.0	2.4		26.7	100	56.2	44.8	100
Means					28.9%					11.9%				34.2%					27.9%	100%	69.9%	30.1%	100%
Means of All Buildings					26.6%					12.0%				33.8%					27.6%	100%	67.6%	32.4%	100%

Percentage distribution of spaces according to functions for the 52 buildings constructed in New York State between 1930 and 1937

of the lack of appreciation of educational requirements on the part of the architect who uses them. In addition, architects, to be sure, are able to make more profits by reducing the amount of designing required.

Competitive Bidding

Attempts have been made to determine the effect of competitive bidding on costs, but up to the present time no clear-cut answers have been found. There is definite information that relationships exist between the number of bidders, the variations in bids, and the size of the contract. The average deviations of bids on all types of contracts vary inversely with the size of the contracts, even after the number of bidders is held constant. There is also an indication that the variation in bids is inversely related to the cost per cubic foot. It appears that in general the more bidders on general construction, the better the chances of securing the lowest possible price. This, however, is apparently not true for the service contracts. It is also felt by students in this field that when bids for general construction vary among themselves by more than 10 per cent, either some contractor has made an error or the plans and specifications are not sufficiently complete. There is considerable question of the desirability of awarding to the lowest bidder, since in many cases it is believed that the lowest bid is made on the basis of error in estimating or because the contractor has found a loophole in the specifications by which he may make substitutes. This whole question of bidding should be made the objective of intensive research. Undoubtedly, much can be learned and many undesirable practices eliminated by a complete understanding of the results of competitive bidding.

Public Works Administration Construction

Of the 52 buildings studied in this research, 26 were constructed with the aid of PWA. The average actual cost of general construction of the PWA buildings was 24.4 cents per cubic foot, compared with 23.3 cents per cubic foot for the non-PWA buildings. However, the analysis indicated that the reasons for the difference were, first, the use of more expensive materials of construction, and, second, fewer bidders. More expensive construction accounted for .7-cent of the difference. The average number of bidders on non-PWA was 13.9, and 8.8. on PWA buildings. Whether or not this decrease in bidders was attributable to PWA regulations or to a smaller number of contractors who were in a position to bid could not be determined.

Site Costs

The costs of sites included in this study ranged from 1 to 18 per cent of the total cost of the projects. Costs of sites ranged from $1,600 to $61,700. Sites for elementary schools averaged $3,600, for high schools $14,300, and for combination elementary and secondary schools $7,250. The cost of site development paralleled rather closely the cost of sites. Approximately one-third of the sites cost less than the site development, and two-thirds had site costs in excess of the costs of site development. It is obvious that the determination of reasonable expenditures for site and site-development costs must be made in the light of each local situation and with the aid of expert educational, landscape, and architectural guidance.

Recommendations

The development of further economy in expenditures for school buildings must await the results of extensive research into the many factors involved in school design and construction. Because of the complexity of the problem and the interrelations of capital outlay costs with maintenance and operation costs it is believed that the most productive research will come through cooperative and correlated studies. The analysis of variations in initial costs of buildings should be related to the analysis of variations in maintenance and operation costs of the same group of buildings. The vastness of the problem of collecting data which are comparable for all buildings studied suggests the need for coordination of the work of local and state agencies with that of the research workers.

This study indicates the costs of certain elements of various types of buildings. A combination of the cheapest of these elements would undoubtedly produce an inexpensive building. It is fairly clear, however, that the cheapest building may be poorly adapted to educational needs. There is need for an appraisal of building design in terms of the educational needs. Such an appraisal might take the form of an educational rating scale based on an intimate study of each building.

The usefulness and desirability of various types of materials, construction, and design in terms of educational needs suggest another field for research which has received insufficient attention up to the present time. The integration of conclusions of research in this latter area with those reached in the studies of costs will indicate the way to true economy in school-building construction.

FOUNDATIONS AS A SOURCE OF AID TO EDUCATION

By ERNEST VICTOR HOLLIS

College of the City of New York

HAS my institution a reasonable chance of getting a grant from a philanthropic foundation for buildings, endowment, instructional support, or research? This question is often uppermost in the thinking of school and university executives who constantly wrestle with the problems of financing institutions whose needs are never satisfied. From the perspective of policies and practices in foundation giving to date, this article will discuss the conditions for securing help from the billion and a half dollars of assets held by 575 philanthropic foundations now operating in the United States.

In the "Crackpot" File

It is assumed that school executives do not belong in the group of people who still believe that a foundation is Santa Claus or that it has "money to burn." Educators do, however, contribute their share of the fantastic and ridiculous proposals for aid that regularly come to foundations. An examination of the 1938 "crackpot" file of one large foundation showed an educator who wanted to be subsidized for a campaign against communists, the foundation to supply money for the deportation of all such "vermin" discovered; another educator wanted the foundation to finance the preparation and world syndication of his ideas on economic reform, which were calculated to gradually supplant capitalism. In asking for a grant for his project, one music educator wrote, "I heard you are interested in song and dance, even for librarians and college professors." The final examples from this file show an institutional executive who requested a million-dollar grant to build and endow a library and research center for the study of the occult "sciences," and one who proposed that the foundation take over the operation of his denominational college, provided the foundation continued to operate it along Christian lines, assumed deficit obligations of $50,000 and paid the sect a nominal sum for its property and good-will.

The Philosophy of Foundation Giving

While the intelligent school executive may smile indulgently at proposals of which the above list is representative, he may not understand why a school, college, hospital, library, or similar institution that truly promotes the well-being of mankind in needy areas should be denied philanthropic aid that is given to similar institutions much better able to shift for themselves. It is not generally understood that foundations operate on the principle of giving "to him that hath" rather than giving as did the medieval almoner to those showing the greatest apparent need. One college president recently stated the philosophy of foundation giving succinctly in declaring that in order "to get a grant from a foundation, a college must demonstrate that it doesn't need it." From the beginning, foundations have believed they can do a more far-reaching service to society by concentrating their grants in a few strategically situated institutions whose influence would be broadcast throughout the land. Foundations do not consider such a policy of giving either undemocratic or calculated to destroy the competitors of the institution aided. They believe the burden of proof is on those who assert that a more widespread or otherwise different distribution of foundation funds would on the whole have produced more beneficial results in promoting the general welfare.

But when the I-smell-a-rat school of investigation learns that its pet college has been denied a grant in favor of a rival institution, it is sure that such money is being used to put the brakes on progress that is normally accelerating. When this school of thought learns that 73.2 per cent of all the foundation money given to higher education during the twentieth century has gone to twenty universities, it asserts that these philanthropies are a menace to democracy and freedom in education. This school of thought calls for a new deal when it learns that the remaining 26.7 per cent of higher education's allotment is unequally distributed among 425 colleges, and that over 800 American colleges have not received, and have no real expectation of receiving, a dollar from foundations. Nowhere has this school of thought offered even theoretical proposals that it claims are better than the ones complained of. Few persons would care to defend the proposal that more good would have been done if the $150,000,000 principal fund of the Carnegie Corporation or the Rockefeller Foundation each had been equally divided among the some 1,200 institutions of higher educa-

tion. It would supply less than $5,000 additional annual income to each of the institutions, enough to support one professor! Surely mankind has received more benefit from the small Carnegie grant to Doctors Banting and Best for their research in diabetes than would have been possible from distributing this or an immeasurably larger sum to ameliorate the sufferings of individual diabetics.

Concentration of Gifts

Whether we like the foundation pattern of giving or not, we must understand it if we are going to seek intelligently for a grant. The second quarter of the twentieth century is witnessing a further concentration in the pattern, whether it is measured by the fewer recipients aided or the lesser number of purposes receiving grants. In the early days of the century, foundations nursed the idea that they could build, equip, endow, and lead a system of colleges that would provide for the needs of America. In the same period they believed they could stimulate public high schools to supply adequately trained freshmen by making grants to state supervisors and professors of secondary education. But during the period 1900-1924 high-school enrolment increased 40 per cent, college and professional school enrolment 250 per cent, and the university grade of graduate work increased 400 per cent. Obviously, foundations had to further concentrate their gifts if they were to remain a significant force in education. They stopped making grants for buildings and endowment generally in favor of similar support to more restricted groups, such as the medical schools; in turn, an ever-expanding medical program forced foundations to desert capital outlay and endowment support for the less expensive current support of teaching and research projects. Since 1925, aid has been further restricted to specific research or demonstration projects aimed at influencing higher education as a process.

The Peabody Education Fund had demonstrated by the opening of the twentieth century that foundation assets were much too small to directly influence individual elementary and high-school systems. Therefore, during the whole of the century, foundations have sought to influence these levels of education through grants to surveys, special studies, scholarships for prospective leaders, and subsidies to state supervisors and professors of secondary education. In higher education we are reaching the stage of giving where foundations no longer expect to wield influence through gifts to particular institutions. Already they think of a grant as *through* rather than *to* an institution; a college is merely an agency for enabling the foundation to influence the whole of the culture. The General Education Board and the Rockefeller Foundation have already announced that they are closing the period of their gifts to individual colleges and universities, and the Carnegie Corporation limits such gifts to about 10 per cent of its annual income. When it is realized that these two groups of philanthropic trusts control 64 per cent of all foundation assets available to higher education, it is known that there is little use to seek a grant for the service needs of an institution; it is worth while only if the agency can be shown to be the best means for developing and broadcasting the idea in question. More and more, foundations are turning to general organizations of scholars, such as the American Council on Education and the National Research Council, as agencies best suited to transmute philanthropic dollars into cultural influence. They are convinced that such agencies can more effectively pool and coordinate the activities of scholars in a field, and the more readily disseminate the findings.

Mistaken Methods of Approach

If the analysis to this point is valid, it leads to the conclusion that a philanthropic foundation is now a poor source to approach for capital outlay, endowment, or current support funds. A school, college, hospital, library or similar institution engaged in a fund-raising campaign can no longer count on a foundation grant on a matching basis which may be used to induce other givers to contribute to the needs of a particular institution. Professional fund-raising counsel, such as Marts and Lundy, Tamblyn and Tamblyn, or the John Price Jones Corporation, no longer count on foundation gifts when they plan to raise money for a college or a hospital. They do not encourage their client to directly approach a foundation with its service needs unless the client has some well-founded reason for so doing. I advise school and college administrators generally not to waste their time and energy preparing a statement of their service needs for presentation to the older and more astutely managed foundations whose programs of activities are matters of public record. Such an effort may yet be worth while with some of the newer foundations that have not yet formulated a stable program of work; also, it might be worth while to thus approach foundations interested in limited geographical areas (such as the Buhl Foundation) or in special causes (such as the Rosenwald Fund). Interested executives can discover such trusts in the list of 125 foundations analyzed in the 1939 edition of "American Foundations and Their Fields," issued by the Raymond Rich Associates of 330 West 42d Street, New York. Some data are available on 700 of the newer and less known foundations and pseudo-foundations from a survey by Robert

M. Lester, Secretary of the Carnegie Corporation. Additional clues may be gleaned from my "Philanthropic Foundations and Higher Education" (Columbia University Press).

Care In Presenting the Case

It is advised that a much better approach to any foundation is to become intelligently informed of the areas of its interest and then to seek its aid in these terms rather than by going to it with a formulated program of needs. This is not to say that an institution should reshape its program in order to be eligible for a foundation grant. Such aid is too small and tenuous to make such planning feasible. Rather it is to suggest that, for instance, if after examining the reports of the Carnegie Corporation a college finds that it is carrying on the type of music, library, or art program the Corporation is currently promoting, it might well put itself in the way to be considered for one of the $2,500 sets of equipment for teaching music or art, or a similar grant for library books. Only a few of the larger foundations have a varied and sustained interest in the major areas of education; the smaller and newer foundations tend to specialize. A seeker of funds, let us say for music education, must know that the Presser Foundation is not interested in all phases of music, but that it makes grants for music buildings. As a next step it would pay the seeker to learn from some college that has such a building something of how the award was secured, rather than asking for one as directly as you would order a ready-made house from Sears, Roebuck & Co. While there is considerable exaggeration about the kowtowing and wire-pulling that make for finesse in promoting an application for a foundation grant, one should at least use the care in preparing and presenting his case that he would use with his banker or in any other important business transaction.

The Best Recommendation

Since more and more of the grants for higher education are made to or through learned societies or their councils, the professor is an institution's best recommendation for a research or demonstration grant. Columbia, Harvard, Michigan, or Chicago do not currently get these grants because they are prestige-carrying names, but because they have professors who are experimenting or innovating on the growing edge of some area of American culture. The institution which has an alert and growing personnel that promises to contribute to the advancement of the profession as a whole, has the best chances for securing foundation funds either directly or through some more inclusive organization. It is of course recognized that such grants are not the "meat and bread" necessary for operating an institution, but they do constitute the essential supplement that may characterize the university as doing more than a routine educational job. The supplement helps the institution to be known not only as a "going concern" but one that is going forward with current trends.

SECTION II
DESIGN AND CONSTRUCTION OF BUILDINGS

PLANNING SCHOOL BUILDINGS

By JAMES A. STRIPLING

School Architect, State Department of Education, Tallahassee, Fla.

THE primary objective in a school-building program is to adapt the plant to the educational policy which has been established by the school officials and accepted by the community. In designing buildings that are to house elementary, junior high, senior high, a combination of any two, or all, one must necessarily plan to meet the varying needs of the different types of organizations. There are, however, many features which are common to all types, and in this discussion differentiation will not be made except where necessity demands.

The Site

The preferred shape for a school site is rectilinear. This lends itself best to arrangement of playgrounds and special activity areas about the building. In selecting a site, the uses to be made of it should be carefully planned. It is important to determine the ultimate size of the building. In locating the building on the site, sufficient area should be provided for setback, for esthetic effect, and for the elimination of street noises and dust. Consideration should be given to the arrangement of walks, drives, shrubbery, trees and gardens. The entire landscaping project should be carefully planned and developed so as to give an appearance of attractiveness and usefulness.

The space allotted to playgrounds should be sufficient to provide for free play areas, playground equipment, tennis courts, basket-ball courts, ball diamonds, football field, track, and bleachers. The playground areas should be sufficient to meet the minimum areas required of the maximum number of pupils to be enrolled. A field house should be centrally located for the storing of equipment. Drinking fountains should be strategically placed. Car parking space should be provided for the pupils and teachers; for the parking of school buses, if transportation is provided for the children; and, in addition, some parking space should be provided for the use of the public.

Regardless of the size of the school, no site should be less than two acres. The number of square feet of net play area needed per pupil is a debatable question. The accompanying plot plan of the Leon High School of Tallahassee, Fla., is an example of efficient planning on the part of the School Board so far as size is concerned. It is a very desirable site for a junior-senior high school enrolling between 1,300 and 1,500 pupils.

The site is divided into two distinct areas by the natural topography of the land, namely, the area immediately surrounding the building, and the general recreational area. The area immediately around the building is of sufficient size to permit proper landscaping, and to allow for walks, drives, etc., as well as for sufficient setback of the building. The general play area allows for 625 square feet per child enrolled. The school could increase to twice the present size without affecting the efficiency of a well-organized recreational program. The development of the recreational area is a community-wide project and will be used as a community center, providing facilities for outdoor activities for the adults of Tallahassee, as well as for the school children.

General Plan

In developing the general plan for the building program, there are two viewpoints we must keep in mind —the educational, and the architectural. From the educational viewpoint, we must consider the ability of the plant to house the pupils and the school program, and from the architectural viewpoint, we must consider the esthetic effect in our selection and adaptation of the materials that go into the building, and also the structural safety of the unit when completed. If a school plant fulfills its purpose, from both the educational and the architectural viewpoint, it may be considered well designed.

Since the school officials cannot determine all the requirements of the future, buildings should be

planned and constructed so that changes, if necessary, can be made in the length and arrangement of the rooms. The unit type of construction will permit a great deal of flexibility in that partitions may be moved or changed at will without incurring much expense. All the pipes, ducts, etc., for the mechanical equipment, as well as the conduits and wires for the electrical equipment, should be placed in the side walls, so that difficulties will not be encountered when changes in length of rooms are necessary.

The general plan should be such that additions can be made to it without interfering with the natural light and ventilation of any existing rooms, or the architectural symmetry and unity of the building. In this connection, careful consideration and study must be given to the location and arrangement of stairs, special units, toilets, heating plants, sewers, and specialized local spaces.

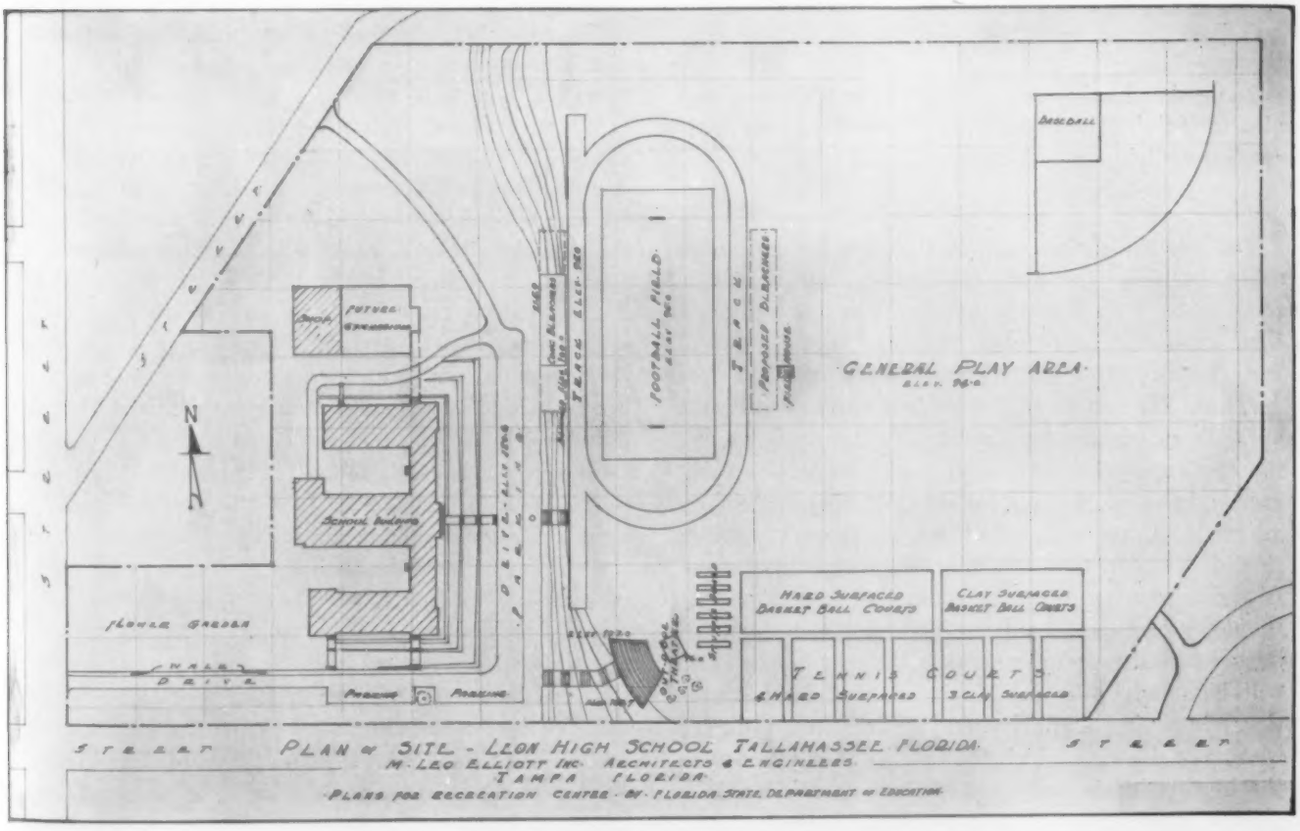
Every foot of space in the building should serve a useful purpose. Classrooms that are too long or too wide, corridors that are too wide, an unnecessary amount of storage space, too many plumbing fixtures, and other excessive spaces or items, all reduce economy in the plan of a building. The maximum utilization of space is one important factor in planning, and, to secure this, it is necessary to have a well-thought-out program and a schedule as to how it will be carried out.

The materials used and the methods by which they are adapted to the purposes for which they are selected should be carefully considered. School officials should look to the architect for guidance in this phase of the building program.

Rarely ever do rural schools need to be over one story in height. Schools for towns and cities may be of such size that two- and three-story buildings are necessary. If it is necessary to exceed three stories in height for a building, elevator facilities should be provided. Where it is necessary to construct three-story buildings, the vertical travel can be reduced greatly by placing laboratories, study halls, libraries, and other similar large floor areas on the first and third floors, leaving the regular academic classrooms for the second floor, as far as possible.

Exits should be arranged with respect to stairs, passages, and corridors so that pockets or dead-ends will not occur in which pupils might be trapped, and so that every classroom door will be within 100 feet of at least one exit. All exit doors should swing outward, and where double doors occur, it is desirable to have mullions between them. The hardware for exit doors should be such that locking from the inside will not be possible. Double-acting doors should not be used for exits.

In planning corridors and stairways, the important consideration is to provide for easy and quick empty-


BASEBALL
FOOTBALL FIELD
TRACK
GENERAL PLAY AREA
N
HARD SURFACED BASKET BALL COURTS
CLAY SURFACED BASKET BALL COURTS
TENNIS COURTS
PLAN OF SITE - LEON HIGH SCHOOL TALLAHASSEE FLORIDA
M. LEO ELLIOTT INC. ARCHITECTS & ENGINEERS
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PLANS FOR RECREATION CENTER - BY FLORIDA STATE DEPARTMENT OF EDUCATION

ing of the building. The width of the corridors will be determined by the size of the school. One is usually safe by keeping in mind three widths for main corridors. For buildings with eight rooms or less, a clear width of eight feet is sufficient. Above eight to fourteen or sixteen rooms, a width of ten feet is usually ample, and for buildings with over sixteen rooms, a width of twelve feet is usually sufficient. These figures apply to clear widths. All corridors and stairs in buildings of over one story in height should be of fire-resistive construction.

Corridors should have sufficient natural light, and artificial light should be provided so as to supply four footcandles of light at the floor level. Radiators, hose reels, drinking fountains, etc., should be recessed. Projecting walls and any similar obstructions should not be allowed in corridors. The finished floor should be of the best quality obtainable in the material selected. Linoleum and asphalt tile are excellent materials to use. They are resilient and noiseless.

Every building of two or more stories should have at least two stairways, remote from each other, and so designed and located that the pupils from the upper floors can exit directly to the yards at the bottom. Hand-rails should be provided on each side of the stairs, and if the stairs are very wide, an intermediate rail should be placed along the center line. Where it is necessary to change the run of the stair, this should be accomplished by a landing equal to the effective width of the stair. Pupils should not be required to ascend more than thirteen or fourteen continuous risers.

Natural light should be provided for all stairs, and also artificial light in an amount equal to four footcandles of light on each step.

Classrooms

The academic classroom is the primary unit of a school building; therefore, the first essential consideration is to determine the number, size, and form of these rooms. The number of rooms necessarily will vary to meet the particular situation, but the size and form are factors that should be carefully thought out. To standardize on the size of classrooms beyond the elementary grades is not practicable. For these grades, however, a standard size classroom is usually adopted. Considering that no elementary teacher should be asked to teach more than 35 to 40 pupils, it is desirable to discuss a room size that will meet the needs of such a number. The classroom must not be so long that a pupil seated in the rear of the room will have any difficulty, under normal light conditions, in seeing distinctly and clearly any ordinary writing or drawing which the teacher may place upon the blackboard in the front of the room. Also, it is necessary that the pupils in the rear of the room shall be able to hear without difficulty what is said in the front of the room. Investigation and observation have found that the normal eye can see from 29 to 30 feet, and that the ordinary speaking voice, as should be used in the schoolroom, will not carry over 30 feet. Therefore, a room 30 feet long should be considered the maximum length. Health authorities have determined that each child should have 200 cubic feet of air. Considering these two factors, we may arrive at the other two dimensions, namely, the width and ceiling height, by the trial method, being careful to keep in mind that the width of the room should not be more than twice the distance from the floor to the top of the windows. The layouts shown for classrooms are considered very desirable. Classrooms should have unilateral light, with the windows placed on the long axis of the room to the left of the pupils, and the net glass area should be from 16 to 20 per cent of the area of the floor, depending upon latitude and the presence or absence of light obstructions. The windows should be high enough above the floor so that the light entering the room will be above the plane of vision of the pupils seated next to the windows. The heads of the windows should be within 8 inches of the finished ceiling, and closer where construction will permit. The windows should be placed so that the distance from the rear wall to the first window will not exceed 36 inches. A blank wall space of not less than 4 feet should be provided at the front of the room between the windows and the front wall. Mullions between windows should be kept to a minimum width so as to prevent shadows across the room.

Where a forced system of ventilation is not practicable, there should be vent windows, or breeze windows as they are commonly termed, in the wall opposite the main windows. For a room of standard size, three such windows, each with an area of 8 to 9 square feet, will make the room quite comfortable. These windows must be placed as close to the ceiling as construction will permit. In buildings where long corridors are flanked on both sides by classrooms, the breeze windows will give considerable light to the corridors, if the glazing is done with clear glass.

The color scheme to be used in decorating the classroom should be considered from the viewpoint of the light reflective value in the color rather than from the individual artistic angle of the designer. Walls of light buff or ivory, ceilings of flat white or light cream, and dadoes of darker colors to harmonize are the preference. The color of the dado is quite important. It is desirable that a restful, soothing color be used in the normal line of vision of the pupils when seated. With the advent of chalkboards in color, a way is being opened up by which the architect can

give more cheerfulness to the present-day classroom by the use of color in the decorations. This cheerfulness is a much needed improvement in schoolhouse design.

In elementary schools, each classroom should have a wardrobe to care for the wraps and personal belongings of the children. For junior and senior high schools, recessed lockers in the corridors are desirable.

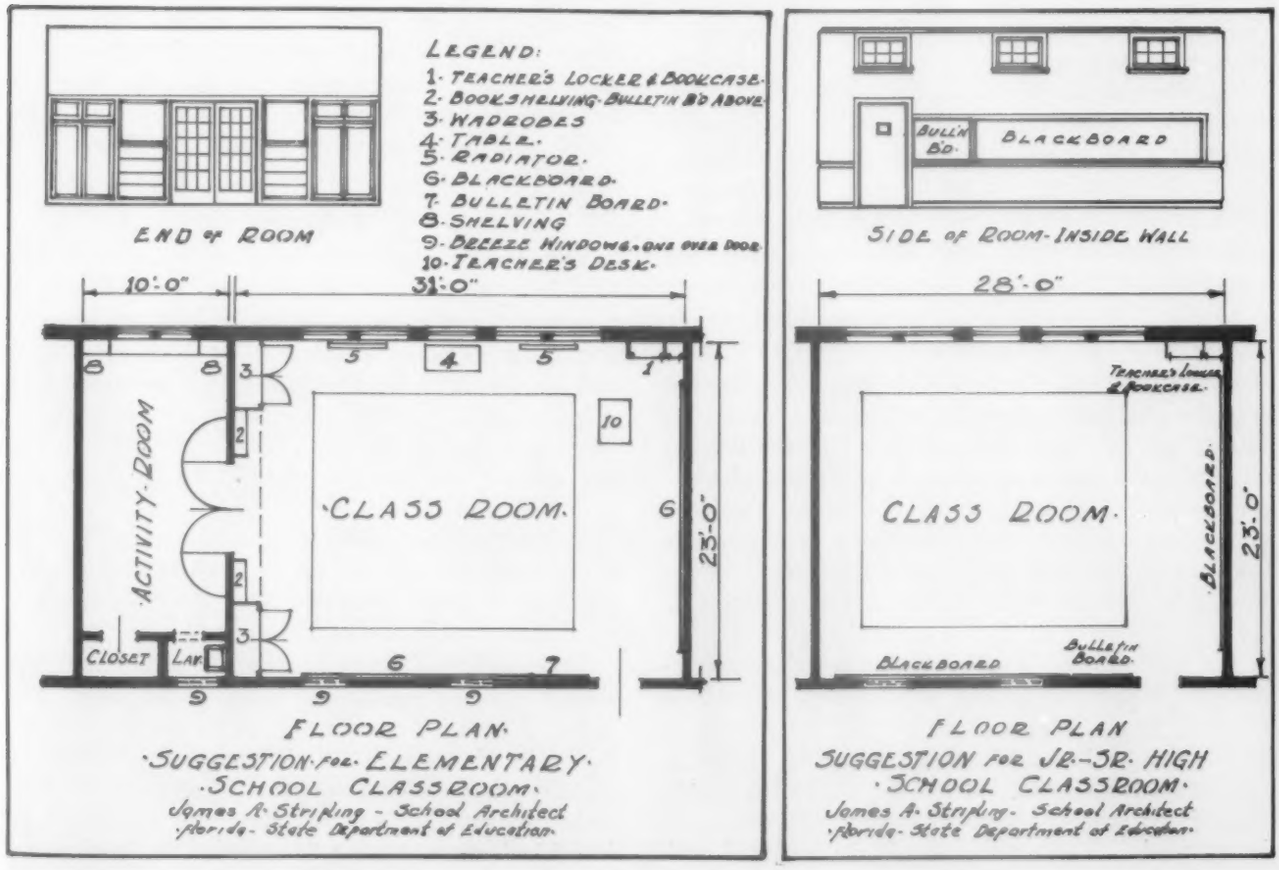
Auditorium

The school auditorium is becoming more and more important in the educational program today. It is not only a vital part of the educational program of the children, but is being used more extensively as the center for community activities. The seating capacity will depend upon the enrolment of the school, and the extent of its use for community activities. In very large schools, it is not economy to attempt to seat the entire student body at one time. In combination junior and senior high schools, the seating capacity should be ample to accommodate the respective groups. In elementary schools, the pupils can be divided into age groups and be taken care of satisfactorily.

The seating capacity is figured by allowing 6 square feet per seat for fixed seats, and 7 square feet per seat for movable seats. This will allow for aisles, but does not include the stage. Balconies are undesirable in that they present administrative problems and certain hazards.

The auditorium should never be above the main floor level. It should be located so that it will be easily accessible to all parts of the building, and, at the same time, so that public gatherings may be held without the necessity of opening up the entire plant. All exits should be clearly marked with exit lights, and every precaution and facility provided for quick emptying in case of emergency.

The stage is often considered one of the places where economy can be practiced without interfering with the school program. This is not true if the stage is to provide the setting for the proper staging of dramatics. In determining the size of the stage, a careful investigation will have to be made of the probable uses. Provision should be made for seating approximately 10 per cent of the school enrolment. In estimating on this basis, one must keep in mind that all seats on the stage must be visible from each seat in the main auditorium, and the area allotted to the seating should be within the limits of the rear and side drops. The proscenium arch should be three-fourths as wide as the auditorium, and the height pleasing in proportion to the ceiling height of the room.



Elaborate stage settings are unnecessary in the average school. However, some equipment which is essential for the efficient use of the stage should be provided, namely: footlights, and these should be on at least three circuits; sectional border lights; floor plugs; a front curtain; and close-in curtains. The central control panel for the stage lighting, as well as the lighting of the seating area, should be on the stage to the right of the proscenium and near the front wall. Dressing rooms with a lavatory, toilet, mirrors, make-up table, and lockers should be provided for each sex. A property room or suitable storage space for the equipment is desirable.

Administrative Unit

It is obvious that the size of the school will govern the amount of space to be allotted to the administrative unit. However, in all buildings of four classrooms or more, there should be an administrative unit. If the staff is composed of only the principal, one room will suffice. For a school of several hundred pupils, where the administrative staff is composed of more than one person, there should be separate offices for the principal, the assistant principal, and in addition, a general office space which can be divided by counters so that it will house the secretarial staff and also serve as a general waiting room. In addition to the working spaces for the staff, there should be provided a book room, storage space for supplies, a fireproof vault, and rest rooms.

The clinic should be adjacent to or near the offices. The size of the school, as well as the size of the staff, will govern the amount of space to be allotted for the clinic. In planning this unit, space must be provided for a general waiting room, a consultation room with dressing rooms and toilet facilities adjacent, and also rooms to care for the sick pupils.

Library

The library today, in many centers, is serving not only the pupils, but also the public. The location is determined by those who will use it. Considering all angles, the first floor seems to be the logical place for the placing of the library. For the convenience of the public and for the convenience of pupils who use the facilities of the library after school, entrances that open directly to the outside are as desirable as those that open to the inside of the building.

The reading room should be large enough to accommodate 10 per cent of the enrolment of the school, allowing 18 to 20 square feet of floor area per seat. In addition to the main reading room, there should be smaller enclosed areas, the number depending on the size of the school, to provide conference rooms for group work. These areas should be enclosed with glass partitions. A conference room to accommodate four students with a work table and chairs is the usual size desired. The librarian should have a work room of sufficient size to facilitate the handling of routine work, such as re-binding, indexing, cleaning, and assorting of books. This room should have a lavatory with hot and cold water supplied, and should be large enough in floor area to provide space for a desk, a table, shelving, and other essentials.

The general shelving for books should be in the main reading room. The top shelf should be not over 6 feet from the floor, and the bottom shelf not closer than 6 or 8 inches to the floor. Shelving should be in sections 3 feet long, and a depth of 8 inches is sufficient except for a few sections of 12 to 15 inches to accommodate magazines and folio books. At least part, and preferably all, of the shelving should be adjustable. In computing the amount of shelving required, allow for eight books to the linear foot.

Among the pieces of miscellaneous equipment for which spaces will be required are a charging desk, atlas and dictionary stands, card catalogs and cabinets, a book truck, cabinets for picture slides, and films.

These suggestions refer generally to junior and senior high schools. The elementary school library is more simple in that it is usually a depository only for books. Each classroom teacher should have in his room sufficient library shelving for books of interest to his particular age group. One thing that should be kept in mind while planning the library is the need for quietness. For this reason, materials which will absorb sound are desired for floor, walls, and ceiling.

Cafeteria

The specific purpose of a cafeteria is to provide food service for the pupils. In view of the fact that this unit is used more and more for banquets, dances, and other forms of gatherings for both the pupils and the people of the community, it is necessary that it be not only a unit for the efficient serving of foods, but also a part of the plant that is attractive, inviting, comfortable and convenient both to the pupils and to the public.

In locating the cafeteria, several things must be considered: Is it convenient to all parts of the building? Is it easily accessible from the yards? Is it convenient to the service entrances?

The number of lunch periods per day will determine to some extent the size of the seating area. Dividing the seating capacity of the school by the number of lunch periods will determine the number of seats required. The necessary seating space may be estimated by allowing 10 square feet per seat. In individual cases, some adjustments will have to be

made where students are permitted to go home for lunch. The shape of the room determines to some extent the efficiency of the service. A long, narrow room will require a longer counter than is usually needed, as well as extra help if placed lengthwise. Where the counter is placed crosswise of the room, congestion of the pupils going to and from the counter is the result. A rectilinear room of good proportions is more efficient from the viewpoint of service, and it can be made more attractive in appearance. The room should be well ventilated, by both natural and artificial means. Materials that absorb sound should be used on the floor, walls, and ceiling. Good natural light, as well as good artificial light, should be provided. These things will add to the attractiveness of the room, and at the same time will enhance the use of the cafeteria as a means of developing the social side of the pupils' life.

The size of the kitchen is dependent upon the number of people to be served. Among the items of equipment for which space must be allowed are: dishwashers; ranges; sinks; vegetable peelers for potatoes, carrots, onions, etc.; mixers for salads and breads; a meat block; space for the baking department; and racks for utensils. There must be room to store food supplies, as well as storage space for china, silverware, etc., and office space must also be provided for the manager.

Washrooms and lockers, convenient to the kitchen, should be provided for the workers. Separate rooms for both sexes should be provided. These rooms should have not only lavatories and water-closets, but also showers. Cleanliness is demanded in food serving; therefore, it is necessary that special attention be given in the selection of the materials for floor, walls, and ceiling of the kitchen.

Sanitation

The locating and planning of toilet rooms is a problem of major importance in school-plant design. Besides the general toilets, there must be toilets in connection with the administrative unit, the clinic, the rest rooms for teachers, and other special rooms, some of which have already been mentioned. There should be one or more toilet rooms, depending on the size of the school, for each sex on each floor. Corner rooms are very desirable because cross ventilation can be obtained. It is important that the rooms be so orientated that they will receive a maximum amount of sunlight. Toilet rooms should never have only a northern exposure. The proper distribution of toilet rooms as to floors is important. It is not desirable that all the toilet rooms for girls be at one end of the building and all the rooms for boys at the other, but rather that alternate placement should be worked out. In buildings of more than one-story in height, the toilet rooms of the first floor should have more fixtures than for the floors above. To determine the extra number of fixtures for the first-floor rooms, add 20 to 25 per cent to the number allotted to that floor on an even distribution basis. The remainder of the total number of fixtures can safely be divided evenly among the remaining floors.

The Florida State Board of Health rules and regulations governing sanitation for schools call for fixtures in the following ratios:

	Elementary Schools	*Junior and Senior High Schools*
Boys' toilet seats	1 for each 25 pupils	1 for each 33 pupils
Boys' urinals	1 for each 15 pupils	1 for each 20 pupils
Girls' toilet seats	1 for each 15 pupils	1 for each 20 pupils
Lavatories	Not given	Not given

One lavatory should be provided for each 50 pupils.

In planning toilet rooms that are to serve pupils in elementary, junior and senior high grades, it is wise to set the fixtures at different heights that will accommodate the different age groups. Water-closets should be placed in stalls that are provided with hardware that will automatically keep the doors open when the stall is unoccupied. The top of the stall partitions should not be higher than 5 feet above the floor, and the bottoms not nearer than 15 to 18 inches to the floor.

The floors and the wainscoting, which should be at least 5 feet high, should be of tile. The walls above the wainscoting and the ceiling should be of Keene cement painted with waterproof paint. All materials used in the toilet rooms should be non-absorbent.

The color scheme should be light, so that cleanliness will be one of the mandatory objectives in the maintenance of the toilets.

Drinking fountains should be placed at intervals throughout the corridors of the buildings. The fixtures should be recessed in the walls, and care must be exercised in locating them so that they are not close to toilet-room doors or too near the top or bottom of stairs.

Special Rooms

In this discussion of school-plant planning, attention has been directed to the units which are required in most plants regardless of the size or use. There are many other units which are necessary when plants are being designed for large centers, and particularly for junior and senior high schools. Among these are the rooms for physics, chemistry, biology, home economics, commercial and manual training departments, the gymnasium, the student activity rooms, and the band rooms.

TULSA BUILDS A HIGH SCHOOL FOR CHANGING SECONDARY EDUCATION

By C. B. MANLEY

Principal, Will Rogers High School, Tulsa, Okla.

TULSA is starting the operation of a new senior high school named in honor of Will Rogers, the most famous native son of Oklahoma. Planned to provide facilities for a modern program of secondary education and to permit future developments in a rapidly changing educational field, the new plant is characterized by its possibilities for flexibility of utilization and adaptability to varied types of educational activity to meet a wide range of pupil interests, needs and abilities. Many features unusual in a comprehensive type of high school are included in order to permit the functioning of an advanced curriculum developed over a period of several years' study and experimentation. Realizing that no present program of secondary education can remain static, those who planned the building have made every effort to allow for desirable change and future expansion.

Site and Construction

The school occupies one of the highest spots in the city. The area immediately surrounding the site of 27 acres is at present free from structures of any kind, and is restricted to the construction of residences in the future. The nearest main arteries of traffic are six blocks distant. Objectionable noises, traffic hazards, and other undesirable features often found in relation to city school sites, are eliminated. The prominence of the location and the gradual slope of the ground away from the building to a municipal park of five acres on the west, provide excellent possibilities for site development, landscaping, and outdoor educational activities.

When completed, the building, site and equipment will have cost $1,500,000. The project was financed with PWA funds and a bond issue of the Tulsa City School District. The present capacity is 1,500 pupils. However, the gymnasium, auditorium, cafeteria, library and other facilities of this type are large enough to allow the capacity of the building to be doubled at a comparatively nominal cost without increasing the size of these units. The architecture is such that the present structure may be readily expanded without alteration.

Several unusual architectural features distinguish the building. To minimize cracking that results from expansion and contraction caused by temperature changes, it is constructed in four distinct and separate sections that are connected by expansion joints extending from the ground through the roof. The auditorium balcony is built on a structural steel cantilever and is not anchored in the side walls. The entire building rests on concrete beams supported by numerous regularly placed concrete piers sunk to the basic rock structure. This was necessary because foundations built on the clay subsoil, which is of unusual depth in the area where the school is located, are subject to serious settling and breaking in periods of sustained drought.

The general plan of the building facilitates ease of control and ready movement of pupils from one portion to another. Five primary entrances and eight secondary doorways provide ready ingress and exit to and from all parts of the plant. The delivery entrance is large enough to permit a truck to be driven into the building.

Decoration

Warmth of color and richness of design characterize the entire building, and are particularly prominent in the corridors, foyers, and auditorium. An Aztec motif was followed in decorating the walls, ceilings, doorways, floors and stairways of these units. Mayan red, dark blue and gold are richly blended and harmonized in the auditorium. Corridor walls covered with soft-hued, pink terra cotta form a pleasing background for Mayan red balustrades, door-frames, niches and vestibules of the same material. Rose terrazzo is used for main corridor floors, stairway treads and risers.

The Auditorium

The auditorium is built on three floors and may be entered directly from each level. The entire student body may be seated in it at the present capacity of the building. It is equipped for visual education and has stage settings that will permit dramatic productions of any type. A stagecraft shop for student and teacher use, and ample storage space for equipment and costumes, are provided. Folding bronze-finished steel gates which disappear in the corridor walls are located so that the auditorium may be completely cut off from the remainder of the build-

Above—The style of architecture is admirably adapted to the prairie setting in which the school is located. Numerous pilasters add height and dignity. Two entrance towers break the expanse of the front wall. Olive-green terra-cotta spandrels relieve the plainness of the buff brick. Cornices and the ornamental border are of buff terra-cotta and the steps and foundations of white marble. The health and physical education unit occupies the left wing, and the auditorium is located in the right wing. Separate entrances are provided for the auditorium

The monumental left front entrance is a memorial to Will Rogers, famous Oklahoman who was born in the county adjoining that in which the school is located. Terra-cotta plaques in spandrels above the doors depict typical poses of the actor-philosopher. (See inset)

Above—Main corridors emphasize the Aztec motif of the architecture. Lighted display cases, niches for statuary, drinking fountains of obsidian black, and library entrances, are on the left. A secondary entrance to the auditorium main floor is at the end of the picture. Rose-hued terra-cotta walls and terrazzo floors form a pleasing background for Mayan red decorative panels and door frames

Right—Blue, gold, and Mayan red designs and fixtures blend with buff walls to enhance the architectural beauty of an exquisitely designed auditorium. The stage is large enough and the equipment adequate for dramatic productions of any kind. The mural on the left was painted on canvas and mounted by a famous artist

ing when it is to be used for evening affairs and community purposes. Separate exterior entrances and a spacious foyer are a part of the auditorium unit.

Classrooms

Every effort was made to design the classrooms in accord with the purposes for which they are to be used. Consequently, there is considerable variation of size and arrangement as well as of equipment. The biology, art, and music rooms are twice as large as the history, English, mathematics, and language rooms. Nearly all the rooms are spacious when measured by ordinary standards. Variation of wall colors, floor colors and designs, and differences in treatment of blackboard space, cork-board, shelving and cabinets prevent the sense of monotony often experienced by pupils as they move from room to room in the average school. The space for classroom libraries, filing and storage is unusually generous.

Wherever possible, movable furniture has been used in the classrooms. Many rooms are equipped with tables and chairs. The science laboratories, with one exception, use movable tables with chairs. Laboratory desks are arranged around the walls in these rooms. Movable furniture in the regular classrooms permits small-group, large-group or individual activities as teachers and pupils may desire, and allows adaptation to a varied and changing educational program.

Laboratories—Library

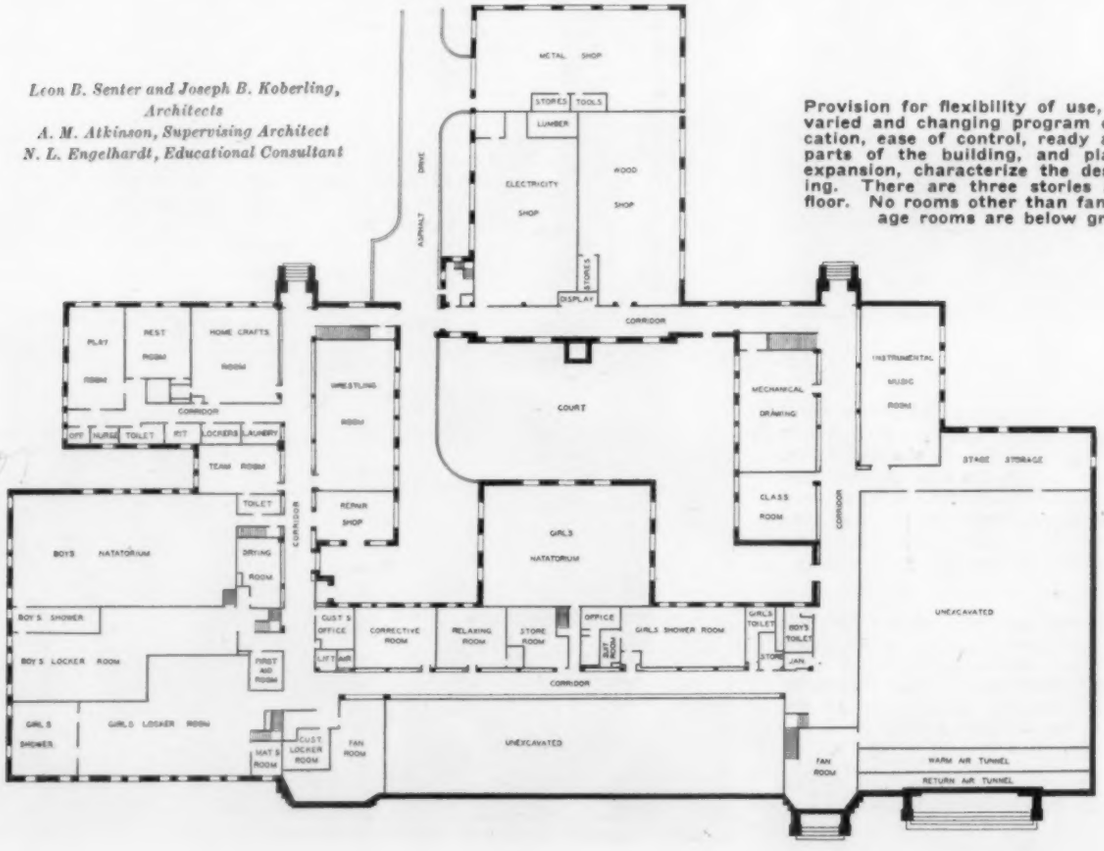
All laboratories are designed and equipped to be used for a variety of purposes. For example, physics, chemistry, biology and geology may be taught in one room, or the laboratory may be utilized for a unified course organized around problems or units that involve all these sciences and others.

Harmony and beauty of equipment, arrangement, design and color combine to make the centrally located library unusually attractive as well as usable. Open shelves completely surrounding the reading room provide ready access to books. Six conference rooms large enough to accommodate eight pupils each are for group work and special study. The librarian's workroom, office and storeroom adjoin the charging-desk space.

For several years, Tulsa schools have emphasized the interrelation of subjects. Curriculum development has had a tendency to center around the problem or unit approach to meeting pupil needs. A considerable degree of subject matter integration has resulted. This tendency is reflected in the plan and equipment of Will Rogers High School. It has already been pointed out that the science laboratories are designed

Leon B. Senter and Joseph B. Koberling, Architects
A. M. Atkinson, Supervising Architect
N. L. Engelhardt, Educational Consultant

Provision for flexibility of use, adaptability to a varied and changing program of secondary education, ease of control, ready accessibility of all parts of the building, and planning for future expansion, characterize the design of the building. There are three stories above the ground floor. No rooms other than fan, boiler, and storage rooms are below ground level

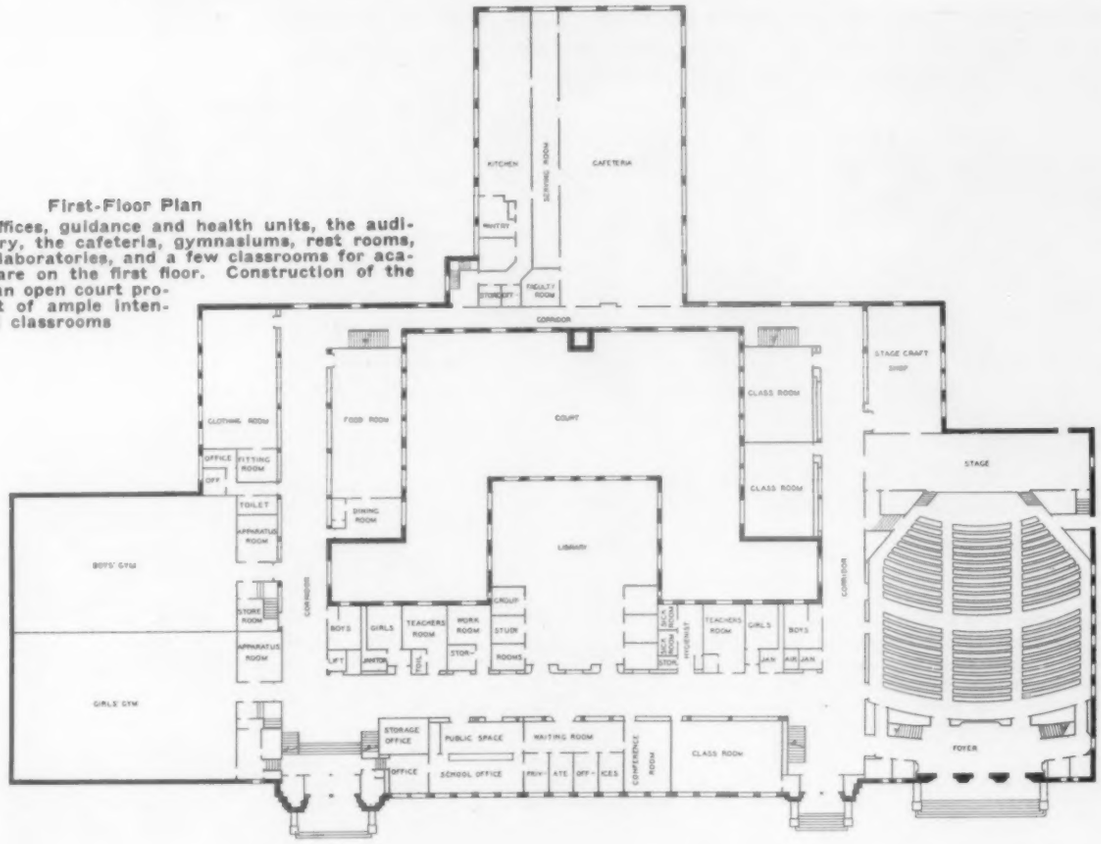


Ground Floor

Because the site slopes sharply from front to back, rear main entrances are located on the ground floor, while front main entrances are on the first-floor level. Dressing rooms, swimming pools, nursery school, industrial arts shops, and the instrumental music room occupy the ground floor. A paved parking lot of 1½ acres adjoins the rear of the shops

First-Floor Plan

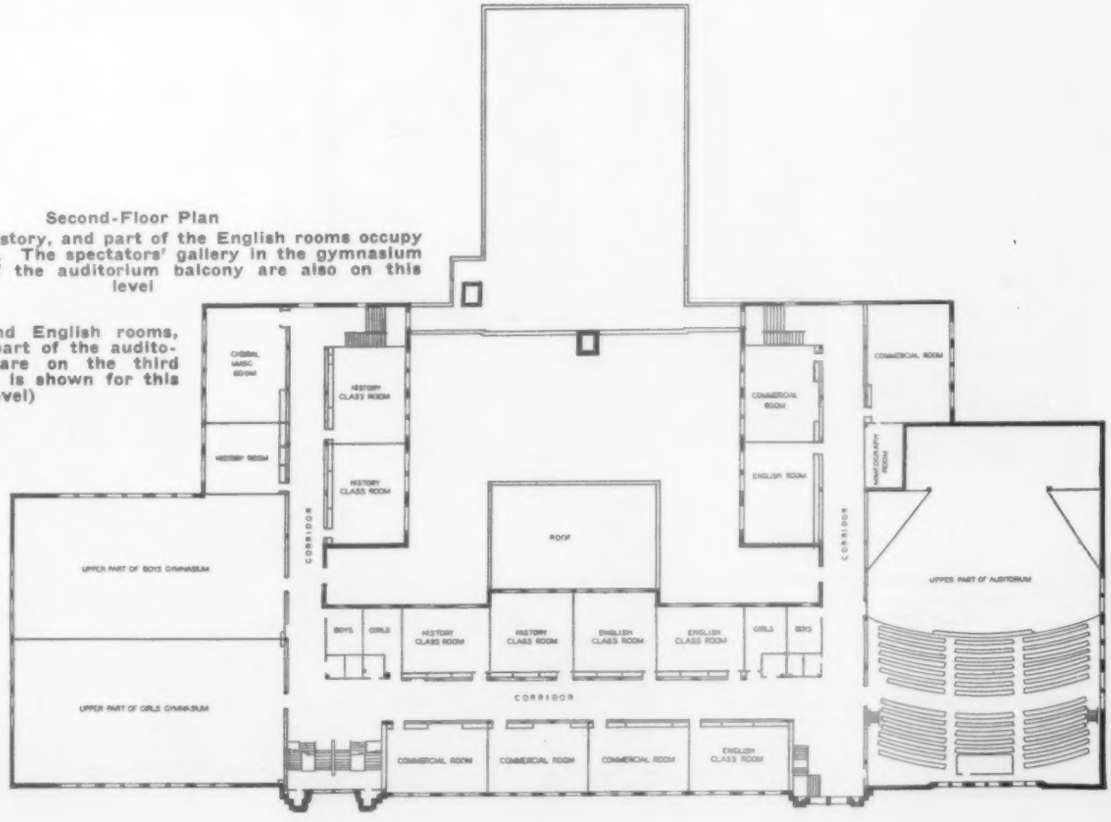
Administrative offices, guidance and health units, the auditorium, the library, the cafeteria, gymnasiums, rest rooms, home economics laboratories, and a few classrooms for academic subjects, are on the first floor. Construction of the building around an open court provides direct light of ample intensity for all classrooms



Second-Floor Plan

Choral music, history, and part of the English rooms occupy the second floor. The spectators' gallery in the gymnasium and one-half of the auditorium balcony are also on this level

Science, art, and English rooms, and the upper part of the auditorium balcony, are on the third floor. (No plan is shown for this level)



All regular and most special classrooms have movable equipment to permit flexibility of use. Some rooms have chair-desks, others have tables and chairs. The number of cabinets and files, the area of bulletin boards and blackboards and of other built-in features, varies greatly from room to room, depending upon use

Floor designs and colors, and colors of walls, are also different in the various rooms. Most classroom floors are of plastic asphalt tile. Venetian shades are standard equipment throughout the building. Blackboards are made of dark-green glass

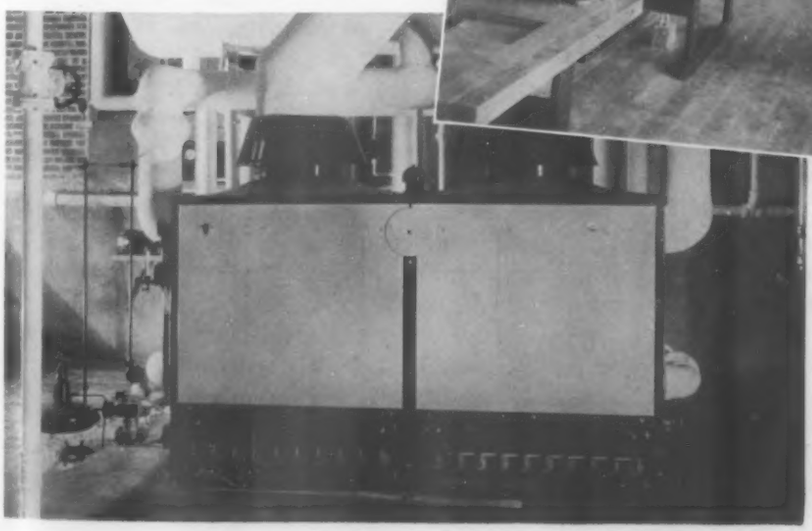
Biology, physics, chemistry, geology and other sciences may be taught in this room. Laboratory desks around the outside are provided with hot and cold water and have connections for both alternating and direct current electricity. Movable tables with chairs are unusual in a laboratory of this type. They permit a wide range of use and adaptation to various subjects

Music rooms are acoustically treated and completely sound-proofed. Recordings of voices and of group numbers may be made and reproduced in this choral room. Programs originating here and in other music rooms may be sent to all portions of the building through the public address system

All laboratories in the family-life education unit are equipped to give students a variety of experiences in this field. The foods laboratory shown here contains four types of kitchens. Tables and chairs permit group instruction and activity as well as individual work. The model dining room in the background is for demonstration and practice

Industrial arts shops are equipped for multiple use. Emphasis is placed on giving students initial competence in an industrial field rather than highly specialized skill in a specific trade. This shop is equipped for auto-mechanics, welding, moulding, and machine work. Tablet arm-chairs on the platform in the rear are used in teaching theory and related subject matter

A variety of electrical training may be given in this shop. Booths at the left are used for house wiring, panel work and other phases of practical electricity. Armature winding, lathe work, and numerous aspects of industrial electricity may be taught. The room is also equipped with tablet arm-chairs for group instruction



This hot-water heating and storage unit is typical of the boiler-room equipment. Heating-plant boilers as well as this unit are fired with natural gas. Automatic controls regulate room temperatures and fuel consumption. The unit system of heating and ventilation is used in all rooms except the auditorium and the gymnasium. Adjustable steel sashes permit ready ventilation through windows

and equipped for educational activities of this type. Other portions of the building are likewise planned to facilitate integration. This is nowhere more evident than in the section of the school devoted to industrial arts.

Industrial Arts Shops

Industrial arts rooms include a combination auto mechanics, forging, and machine shop; an electric shop; a woodworking shop; and a drafting room. Adjoining the latter, there is a regular classroom in which mathematics and other subjects directly related to the industrial arts may be taught. The first two shops listed are also equipped with tablet arm chairs. Science and theory related to the training for practical activities given in these shops are regularly taught as a part of the course of study. Equipping a shop for a variety of related activities also permits more effective use of it. Small classes or unused periods in the daily schedule are not so likely to be necessary, because shops can be used for different courses.

The industrial arts shops are planned with the intention of training students for initial competence in any one of a variety of jobs in a given industrial field rather than for the purpose of making skilled mechanics in specialized occupations. For example, the electrical shop is equipped to provide a background of theoretical and practical training in almost every type of electrical work done on the trades level. Students who complete the course will be able to start as beginners in nearly any position open to them in the field of electrical occupations. They will not be restricted to any particular highly specialized trade within this field.

Family Life Education

A most unusual and interesting feature of the school is the section designed for courses in family life education. All students are required to take these courses, which include appropriate instruction in child care and training. The unit in which they are taught has, in addition to regular classrooms for the high-school students, a completely equipped nursery school. A kitchen for preparing food for the nursery-school children, a laundry, a sleeping room, a health unit, and an observation room that has a one-way screen to permit students to watch the activities of the nursery pupils, constitute integral parts of the nursery school. All these facilities are used for training students as well as for the accommodation of the nursery-school pupils. A separate exterior entrance to the nursery school enables parents and children to enter or leave without passing through the remainder of the building. A paved outdoor play court is a part of the unit. Rooms and equipment are provided for teaching high-school students all phases of education pertaining to the home and family life.

Offices, conference rooms, and other appurtenances necessary for the development of an effective guidance program have been included in a suite of rooms adjoining the administrative offices. Provisions for student activities include a publications office, a conference room for small group student meetings, a speech arts room, and a public address system that permits programs worked out in band, orchestra, choral music or elsewhere to be broadcast to all parts of the building.

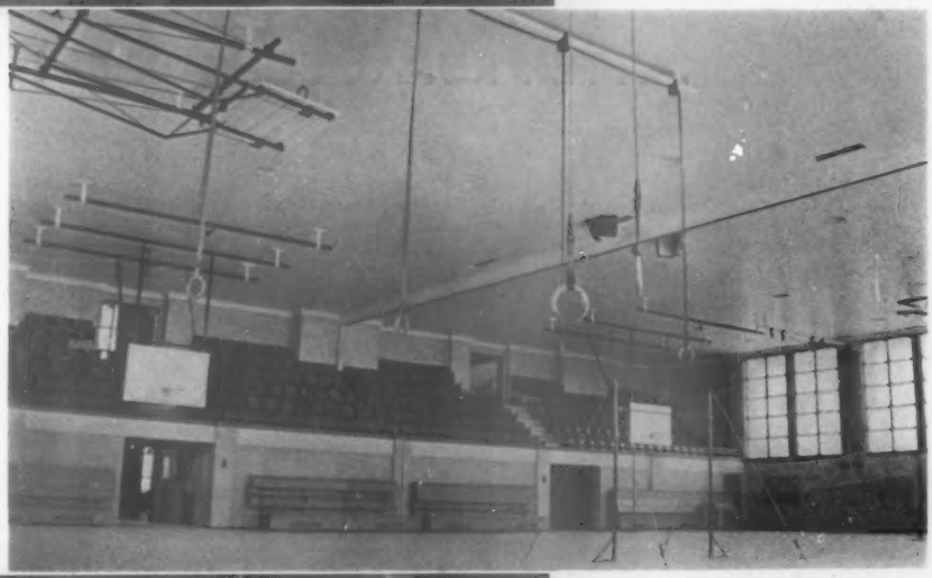
Physical Education

Health and physical education facilities meet the exacting demands of a modern program. A large gymnasium which is equipped with mechanical bleachers that fold against the wall, and which has a balcony for spectators, is divided by a movable soundproof partition to make separate divisions for boys and girls. Separate swimming pools are also provided for boys and girls. A relaxing room, a room for corrective exercises and a photographic booth for posture work are included in the girls' section of the unit. Team rooms, storage space, space for health examination offices, and other facilities related to control and administration are unusually adequate. Special entrances lead directly to playing fields that provide space for football, baseball, softball, tennis, soccer, field hockey, archery and many other games. The boys' swimming pool is equipped with bleachers to accommodate spectators who attend swimming meets. The gymnasium and team rooms may be cut off from the remainder of the building by folding steel corridor gates when night games or other activities are in progress.

Acoustical treatment has been provided wherever needed. Chorus and instrumental music rooms are completely soundproofed. The gymnasium, the auditorium, the cafeteria, all corridors, typewriting rooms, the library, swimming pools, and other units in the building have been acoustically treated.

Those who planned and built the Will Rogers High School believe that it should serve several oncoming generations of boys and girls. To give them the kind of educational program they need whatever their status and conditions under which they may live, has been the aim. Flexibility and adaptability to promote and not hinder a growing, rapidly developing plan of secondary education that is in accord with modern trends and that will change with future needs has been sought and in a large measure achieved. Utility and durability have been combined with beauty to make a lasting monument for a great American, and an educational plant that will serve tomorrow as well as today.

A completely equipped nursery school is a part of the family-life education unit. The one-way observation screen at the back of this playroom permits students to observe activities and behavior of nursery pupils. Other rooms in the nursery school include a kitchen, a laundry, a sleeping room, a locker room, and a nurses' room. Separate entrances and a segregated playground are provided



This gymnasium may be divided by a sound-proof folding partition that moves across the track in the right-center of the photograph to provide separate physical education rooms for boys and girls. Folding bleachers, mechanically operated, and a gallery for spectators, will seat 1,200 persons

Separate swimming pools are provided for boys and for girls. Floors are made of non-slip tile. Bleachers in the boys' pool room accommodate spectators who attend swimming meets. Powerful floodlights and white tile walls and floors of the pool make all portions visible

BETTER RURAL SCHOOL BUILDINGS

By HANS W. SCHMIDT

Supervisor School Building Service, State Department of Public Instruction, Madison, Wis.

OF late years the school-building situation in our country has become a serious problem owing to a number of causes, although the initiated are aware that the problem existed long ago.

One cause was the World War and its aftermath of slow recovery which kept the status quo so far as school housing was concerned, as to repairs and upkeep and the need for actual replacements. Then, when we were on our way, the 1929 slump struck us and we were just where we had been twenty years before. Another factor was the increase in enrolment, especially in the high schools, whose attendance figures rose by leaps and bounds—we were just caught napping.

During the past three years the Federal grants for school buildings have been a godsend and have done much to relieve the acute situations existing in thousands of communities. At least we are afforded a breathing spell, and things look much better than they did ten years ago, so far as school buildings are concerned; but much is still to be done.

A study of the statistics published from time to time by various agencies shows that the bulk of school construction has been diverted to cities and urban communities, and probably this is in accord with the needs and with the numbers involved. Nevertheless we should be impressed with the fact that the rural communities are not well represented and have not fared so well; we are referring to the strictly rural situation, with one- to four-room school buildings, of which there are upward of 100,000 in the country. It is true that considerable repair work was done on these structures, but not to an extent which was possible.

Despite the fact that these schools are diminishing, owing to consolidations and other factors, their number will be around 100,000 for a good many years; in fact, there are thousands where no change may ever come, owing to local conditions. This is not a theory, but a case of hard facts. Shall we therefore sit by and leave the old red schoolhouse in its present form? Are the children in these schools not entitled to as good school buildings as their fellow students in larger and more fortunate situations? Can we not bring to them well-designed and engineered buildings with modern sanitary features and healthful surroundings? As an abstraction, the answer is of course yes; but in the concrete this is by no means the case, which any school man who is familiar with the situation will verify. Academically, we ask: Why not? What *is* the answer?

Analyzing the Situation

Such questions confronted the Wisconsin Department of Public Instruction over a decade ago,—in fact, years before that,—but several local issues brought the situation to the front about 1927 and a study was begun to see what really happens in the

rural school-building field. Of course we can vouch only for the Wisconsin situation, but observation and field experience show that other states are in the same situation.

In the first place, observation and study showed that literally hundreds of school buildings were being planned along the old, orthodox lines. You know the kind: a long, oblong box with a ridge roof and two gables and containing a classroom, usually too small, and a cloakroom. The variant was the square type with a hipped roof or sometimes a flat roof to carry out the box idea. Some of these structures were erected from stock plans, others were definitely designed along this line.

A little analysis showed that many of these buildings were not designed but just drawn. The idea that the modern school calls for other spaces than just a classroom had not been accepted as yet, nor that a study of local needs and demands was fundamental to the whole problem. But such studies could not readily be made by the average designer, for perfectly obvious reasons—they cost money and take time, and the knowledge for undertaking such study was nearly always lacking. In other words, the job of carefully and expertly designing the small rural school could not take the attention of the specialist, because the fees did not permit such analysis and study. So we had the duplicating idea, and the stock plan scheme (usually ten or a dozen—take one or leave it) and oftentimes not much of any notion at all.

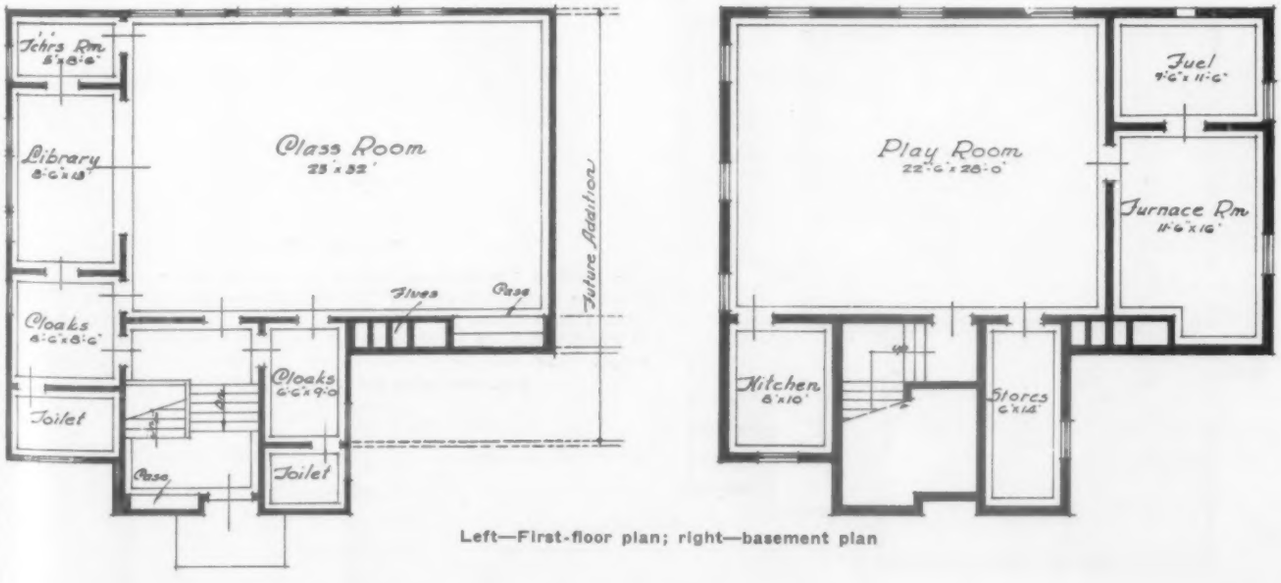
Another important factor in the whole set-up was the cost of the service to the local school district. Low valuations, small incomes, tax delinquency, the economic slump and other matters often forced the rural school board to take what they could get. Again, the average layman—and a good many of the school board members are farmers or small business men—does not appreciate the need for careful study and the necessity for applying sound educational principles and engineering practices of various kinds to even a simple structure. And even if he did, the people of the community as a rule do not appreciate the situation. Have you ever heard anyone say: "My father went to this school, and I guess it's good enough for my kid?"

A Right-About-Face Attack on the Problem

The whole situation, the general aspects of this problem, bothered the state educational administration a good deal. The rest of this brief article will deal with ideas that were developed to help the rural school-building situation so that all the children of the state might have a first-class educational environment, healthful surroundings, a pleasing atmosphere, and a building which would serve the community to the best advantage at the least cost. Not a small program, you say—and one which could not be achieved over night.

The first attack on the problem was through the Industrial Commission of Wisconsin; all school plans must be officially approved by the Commission. Under a working arrangement, all plans are submitted to the Department of Public Instruction for suggestive checking and criticisms. This method, which of course deals with school buildings of all kinds and sizes, has resulted, in many cases, in better-planned structures and the discovery of errors in arrangement. The results have been very gratifying.

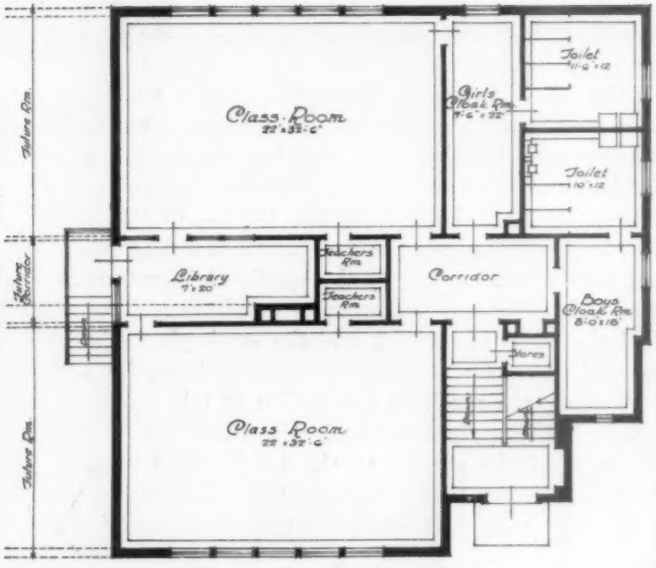
A Modern School Plan for a Rural School Now Being Erected



Left—First-floor plan; right—basement plan

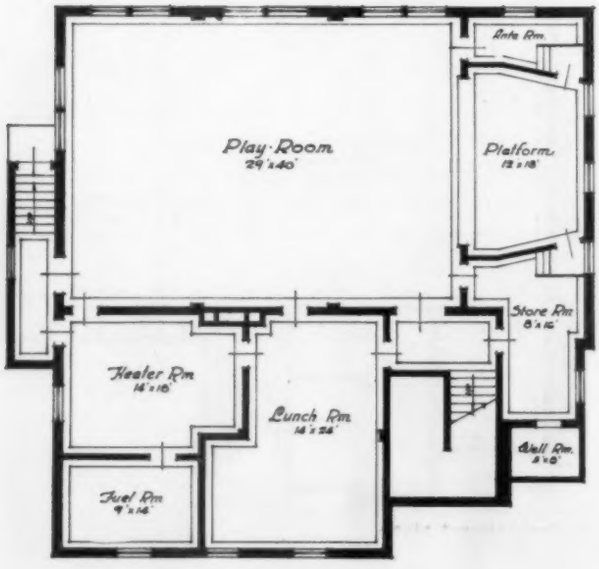
Front Elevation

Exterior walls faced with a warm variegated buff brick, dark green asphalt shingles on the roof, and ivory trim, all make for a pleasing appearance



First-Floor Plan

This building contains approximately 85,000 cubic feet gross, and was erected, complete in 1936, at a cost of $18,000, or 21.2 cents per cubic foot. The classrooms and library have a maple floor, and all remaining first-floor rooms are asphalt tiled, except the toilets, where tile floor and base are used. Each classroom has accommodations for approximately 40 pupils

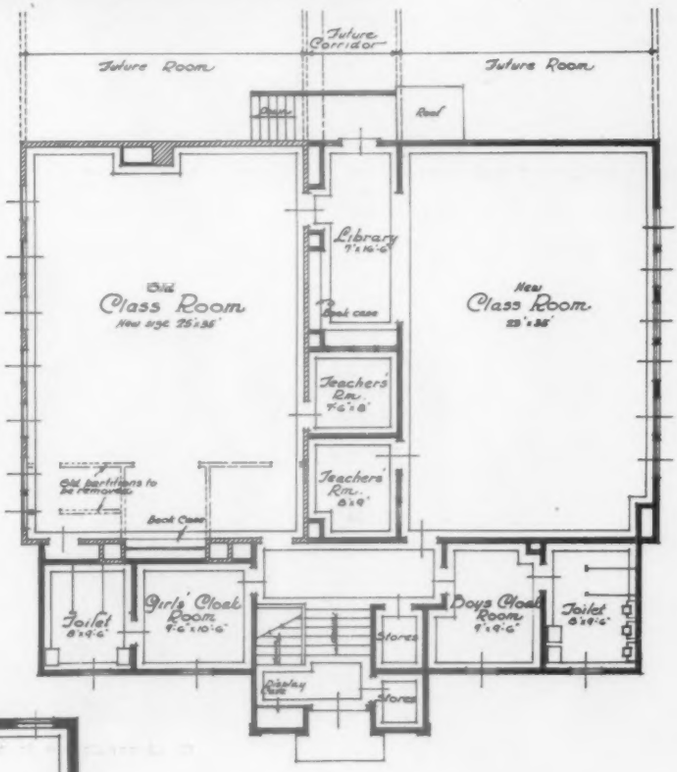


Basement Plan

The building has basement walls of concrete and a superstructure of frame with brick veneer. The heating and ventilating is accomplished by a steam plant using unit ventilators. The play room is 10 feet 6 inches in height and will accommodate approximately 175 people when used for an auditorium. The emergency exit from the playroom also serves as a janitor's stair

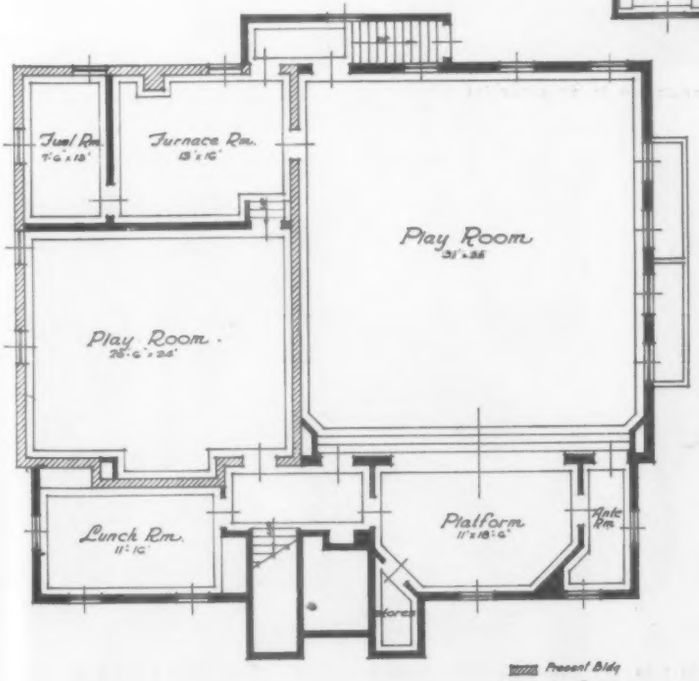
Front Elevation

The blinds are painted dark green to contrast with the cream of the exterior walls



First-Floor Plan

The antiquated school pictured on page 42 was reconverted at a cost of about $11,000. The teachers' rooms also serve as conference and rest rooms. Storerooms for cleaning equipment are provided in the entrance hall. The cloak rooms are equipped with slotted shelves above iron pipe hanger rods



Basement Plan

The building has basement walls of concrete with a frame construction above. Heating and ventilation are provided by means of a forced hot-air plant. The lunch room is provided with cooking equipment and wall counters, thus serving as a kitchen when the occasion demands. The small play room can be used by the children in the lower grades

Modern equipment and arrangement. Note ventilated wardrobes

A community hall in the basement of a two-room school

Good sanitation is an essential

Note large work area and ample storage space provided in this one-room building

This one-room school has plenty of storage space and a generous bulletin board

A pleasing exterior. Rear extension is fuel and storage room

Asbestos siding as used on a one-room rural school

A modern heating plant serves unit ventilators

A two-room structure of native stone, erected by WPA. The vent heads make for good ventilation

The attractive exterior of a one-room school which, though rural, contains all modern conveniences

However, it was observed early in this scheme that the rural field was still being neglected—there was a lot of the old routine in evidence, and unfamiliarity with the requirements of this particular situation resulted in so many instances of poorly constructed and ineffective buildings that something had to be done about it.

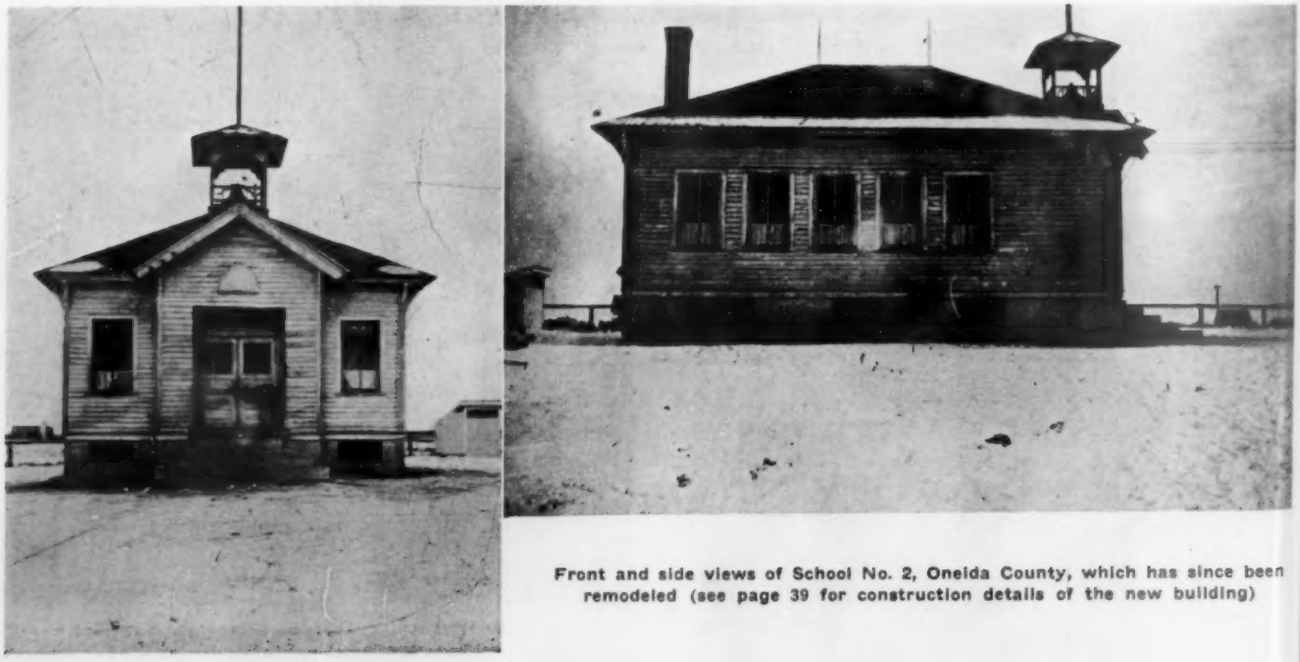
The consequence was the establishment of a school-building service which dealt largely with the rural school situation as a most important factor. The supervisor and his assistant did a large amount of field work and inspection. Their advice on all phases of school-building construction and engineering was not only available but eagerly called for. Problems of construction, lighting, heating and ventilating, electrical engineering and other pertinent matters were discussed with school boards, and proper advice was given as the situations demanded. Then, too, the people were getting a different slant on their problems, appreciating the need for certain phases of school housing, and were also in a frame of mind where they were willing to make changes and improvements—and to furnish the funds, no small task.

No Stock Plans

Another contribution of the service was complete architectural service for one- and two-room buildings. Under a "gentlemen's agreement" with the architectural profession, the Department did not exceed the above limitation and has held rigidly to it. At first it was thought that after a possible forty or fifty plans had been made, duplication would follow. But a large number of variables, such as type of construction and materials, size of buildings and classrooms, orientation of building, kind and number of auxiliary rooms, use of basement areas, types of heating plants, design (architectural treatment), fitments and cases and other factors, as well as ability to finance, to say nothing of local desires, made it almost imperative that every situation be treated as initially and specifically different from all others. In other words, it was found necessary virtually to design all buildings from the ground up. The result? At present we have 332 different plans for one- and two-room schools—and the end is not yet. We have no stock plans!

Providing additions, enlarging schoolrooms and buildings, designing spaces and making layouts for toilet systems, plans for electric lighting, layouts for heating and ventilating, and other matters too numerous to mention, are all a part of the service rendered the school boards of this state. These jobs run into the hundreds each year. In addition, all our plans of whatsoever kind are approved by the Industrial Commission and the State Board of Health. The cooperation of all agencies of the state in promoting this type of work is a bright star in the firmament of the school-building field.

In consequence of this policy the state is not covered with rural school buildings which are alike; an attempt is made to fit the buildings into their locale so far as possible and to make them safe, well constructed and fitted to the needs. Many of them are so planned that additions or enlargements may be made without undue reconstruction. The accompanying diagrams and photographs are objective evidence of the work being done.



Front and side views of School No. 2, Oneida County, which has since been remodeled (see page 39 for construction details of the new building)

ACOUSTICAL PLANNING FOR MODERN SCHOOLS

By

J. P. MAXFIELD
Director of Commercial Engineering

and

C. C. POTWIN
Technical Consultant

Electrical Research Products Inc.

THE romantic little red schoolhouse is obsolete, but the education it symbolized has gone forward toward new and greater goals. Modern educational methods strive to make learning simpler for the student, and contemporary architecture is contributing materially to the execution of this new aim. Sound, as a vital medium through which knowledge is conveyed, makes good acoustics one of the fundamental requirements in coordinating new educational methods with the architectural planning of school buildings.

The ability of a student with normal hearing to grasp or interpret the instruction directed to him through the medium of sound is determined largely by the acoustical conditions of the enclosed space through which sound travels to his ears. If the original sound is marred by excessive reverberation, echo or noise, it becomes difficult for the student to reap the benefits intended for him. With the comprehensive acoustic information and expert technical assistance available to the school board and the architect, good acoustics can be assured in every school auditorium and classroom today and can be planned for in advance of construction.

The acoustical problem as it relates to schools may be divided into two general classifications:

I. Planning for the elimination or control of extraneous noise originating at sources either outside or inside the building.

II. Planning for the best possible hearing conditions in rooms where the intelligibility and naturalness of speech and the quality of music are primary considerations.

Noise

The effect of extraneous noise is twofold. It produces a masking effect which makes it difficult for a speaker to be heard unless he raises his voice to overcome the interference; and it makes mental concentration difficult for the student. Attempting to concentrate in the presence of extraneous noise means unnecessary expending of nervous energy. The effort involved is detrimental to both the mental and the physical well-being of the student.

For protection against extraneous noise, fundamental consideration must be given in planning to:

1. Selecting a site where reasonably quiet conditions can be assured with respect to outside noise sources;
2. The proper allocation of various units of the building in order to minimize the passage of extraneous sounds from one unit to the other by way of outside or inside paths;
3. Sound insulation within the building, if proper allocation of rooms cannot be obtained; and
4. The treatment of internal surfaces with sound-absorbing materials, where necessary, to minimize extraneous sounds originating within the units themselves.

The Site

Not only is the location of the building important in its relation to transportation facilities, natural light, and pleasant environment, but equally so with regard to noise conditions, because the latter factor affects both the construction of the building and the allocation of its units.

Traffic noise is usually the greatest outside offender. For this reason the building should be set back from the street as far as practical, if selection of a site adjoining main traffic arteries is unavoidable. If windows must be opened for ventilation, interference from outside noise sources cannot be overcome unless all rooms wherein noise would be most disturbing are situated in that part of the building farthest removed from the noise source. Greater tolerances may be allowable when forced ventilation and air conditioning are employed so that tightly fitted windows can be kept closed, or materials such as glass brick can be utilized to furnish the desired amount of natural light.

The factor of sound transmission through structural vibration, such as that caused by heavy trucking, should not be overlooked. This is a particularly important consideration when the building is to be located on a busy thoroughfare, and may involve special design and treatment of the building foundation if the preliminary noise survey of the site indicates that it represents a major problem.

Allocation of Units

In allocating the various units of the school plant it is highly desirable that such units as the auditorium

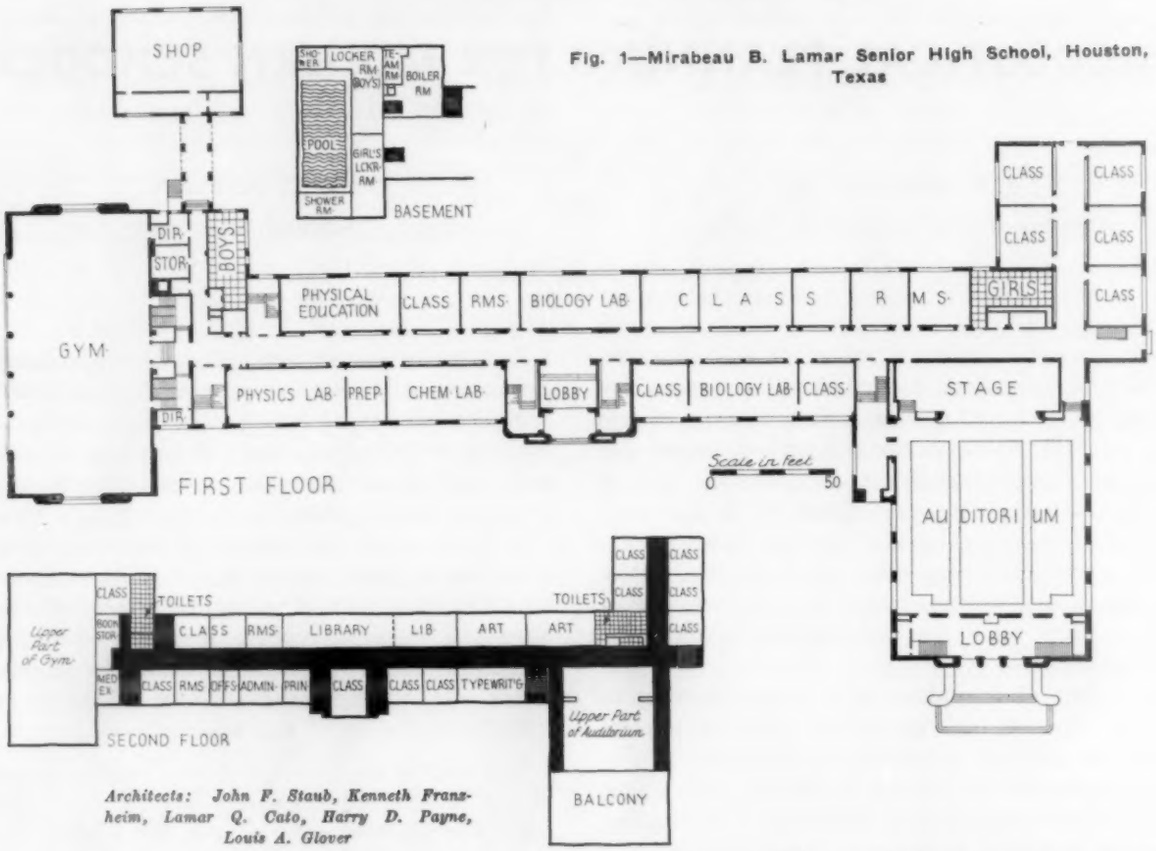


Fig. 1—Mirabeau B. Lamar Senior High School, Houston, Texas

Architects: John F. Staub, Kenneth Franzheim, Lamar Q. Cato, Harry D. Payne, Louis A. Glover

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and the music room be physically removed as far as possible from such other units as the gymnasium, workshop, cafeteria, and kitchen; and, in turn, that all these units be separated as much as possible, both physically and acoustically, from classrooms, administration units, the library, and all other spaces where quiet conditions are indispensable.

Fig. 1 shows a plan for a secondary school wherein the physical arrangement and relationship of various units have been well conceived and executed. Where space permits it is almost always less costly to allocate units properly with respect to sources of noise within the building than it is to insulate the units against the transmission of noise from one to the other. Nevertheless, an ideal arrangement is not always possible, particularly in cities and large suburban communities where space is usually a limiting factor. In such cases where it may become necessary to locate the auditorium and the gymnasium close to each other or to quiet units, and it is proposed to use these spaces simultaneously, sound insulation may often prove to be the most economical solution.

Sound Insulation

Sound insulation can often be accomplished by using corridors or sound locks in the form of internal lobbies for separation, with fairly heavy dividing walls between in all cases. On the other hand, double wall construction, separate foundation work and isolated suspended ceilings may be necessary if the grouping is extremely compact and at least a reasonable separation, from the acoustical standpoint, cannot be achieved. In those cases where the gymnasium adjoins the auditorium, and the stage is common to both (a plan typical of several recent projects), precautions should be taken in designing the dividing partitions to ensure the maximum possible reduction of noise through these partitions to the stage, when the auditorium and the gymnasium are used simultaneously as separate units.

Treatment of Internal Surfaces

Acoustical materials, applied to the walls or ceilings of rooms to reduce extraneous noise or to control reverberation, vary considerably in their absorption of sound at different frequencies. Many of these materials are *selective* in absorption; that is, they absorb sound to a much greater extent at some frequencies than they do at others.

The ideal acoustical material for noise-reduction work, as well as for the acoustical correction of many listening rooms, would be one which absorbed sound nearly equally at the low, middle range, and high frequencies. Such a treatment would produce a room "restful to the ear" and not having the oppressive or heavy feeling commonly experienced in the so-called "dead rooms" where the material used absorbs sound selectively at the high frequencies.

Materials are available which have practically uniform sound-absorption characteristics, but many of them are costly and involve special methods of application. From the practical viewpoint, therefore, it is often necessary in the treatment of such spaces as corridors, rooms used for typewriting, bookkeeping and mechanical arts, and in the cafeteria and kitchen, to use materials having their maximum absorption at the particular frequency regions of the noise produced in those spaces. The use of materials having very little sound absorption at the low frequencies should be avoided.

Rooms for Speech and Music

In rooms where the intelligibility and naturalness of speech and the tonal quality of music are primary functions of their use, consideration should be given to (1) the shape of the room, and (2) the proper selection and distribution of sound-absorbing materials with respect to shape and to the various uses for which the room is intended.

The Conventional Classroom

The small rectangular classroom of conventional design seating between 25 and 50 students does not present any unusual or difficult acoustical problem. Careful attention should always be given, however, to the selection and placement of the sound-absorbing materials.

When correct listening becomes a major consideration, either alone or in combination with the reduction of extraneous noise, the most satisfactory conditions are almost always realized when the sound-absorbing material is distributed in panels and in such a manner that no large areas or single surfaces in the room are completely covered. On the other hand, in rooms where the reduction of extraneous noise is the principal objective, more complete coverage of surfaces is frequently desirable.

A typical plan of treatment for the conventional classroom is shown in Fig. 2. The acoustical material is distributed in panels over the wall and ceiling surfaces, and is arranged in such a manner that there is slightly more sound-reflecting or "live" area at the front than at the rear of the room.

Rooms of this type should have a time of reverberation of approximately one second when planning for good listening conditions only. The size and arrangement of panels for this condition of treatment are shown with solid diagonal lines in the figure. When the reduction of extraneous noise must be considered in addition to the basic requirements for good listening, a reverberation time of between .70 and .80 seconds is preferred. This requires a slight increase in the amount of acoustical treatment, which is shown as diagonal broken lines on the typical plan.

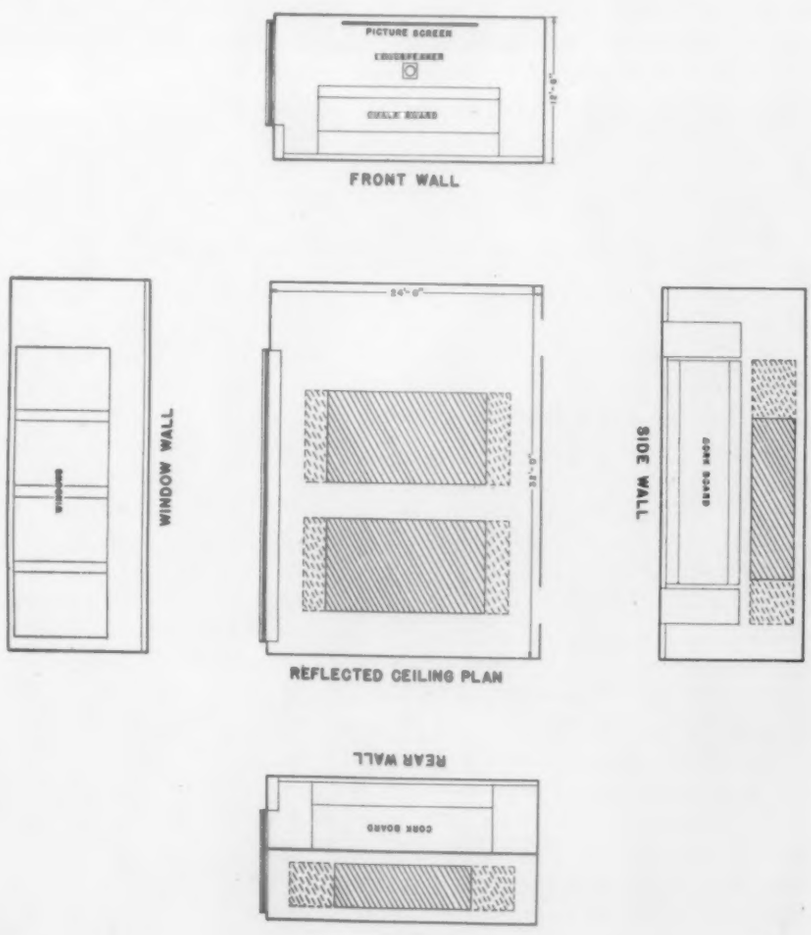


Fig. 2

It is possible to obtain a pleasing decorative effect with this arrangement of treatment either through leaving the panels exposed or by using combinations of absorptive and non-absorptive materials or coverings having the same surface texture and appearance. Not only is such a plan more efficient acoustically, but it is also more economical than covering entire surfaces with absorbing materials.

The Multi-purpose Classroom

Today there is a noticeable trend toward the use of larger classrooms in elementary and secondary schools. In such rooms the activities of one particular class may be carried on throughout the school day without having the students move to another unit. As exemplified by several recent designs, this large room may be planned so that it can be divided into smaller units through the use of removable or sliding partitions.

This particular classroom presents one of the more complex types of design because of its size and the physical factors involved in dividing it. Basically, for acoustical purposes the length dimension of the room should not be greater than three halves the width dimension and, if possible, the side walls should be splayed slightly away from the front of the room. The dividing partitions if used should also be "out-of-parallel" with respect to each other and to directly opposite walls, and should be carefully designed to prevent excessive transmission of sound from one unit to the other. The sound-absorbing material used within the room should preferably be installed in panels over the ceiling and walls in a manner similar to that shown in Fig. 2, although somewhat more evenly arranged from one end of the room to the other so that the absorption may be suitably distributed for the individual units when the room is so divided.

Single-Purpose Rooms

In designing single-purpose classrooms to best fulfill their intended uses, a particular shaping of the room or arrangement of surfaces is initially helpful in controlling sound. For example, the Oral English and Recitation Room shown in Fig. 3, where the true characteristics of speech are so vitally important, has the seating and platform arranged diagonally. This arrangement is a very desirable one from the acoustical standpoint. When the sound-absorbing material is properly distributed and the correct amount of sound-reflecting surface or "liveness" is retained near the platform and at specific points to the rear of the room, a splayed wall effect of this type gives the desired directionality to beneficial sound reflections and enhances the character and naturalness of speech. Retaining a certain degree of controlled liveness by properly coordinating non-parallel or irregularly shaped surfaces with a rather widely distributed arrangement of sound-absorbing material, is also very desirable for such other rooms as the lecture hall, the dramatic arts classroom, and the audio-visual studio.

In selecting acoustical materials to fulfill the requirements of speech rooms, these materials should as a general rule have relatively high sound absorption coefficients at the low and middle range of frequencies, and smaller coefficients at frequencies above 2,000 cycles per second.

The Music Room

The acoustical problem of the music room differs considerably from that of the classroom, because more reverberation is desirable. This does not mean that the reverberation in music rooms should be extremely high, but rather that it should be sufficient to enhance the brilliance and timbre of the music.

Depending upon the size of the room and consequently the amount of sound absorption required, a limited amount of acoustical material widely distributed in panels over the walls and ceiling is usually desirable. The time of reverberation should lie between 1.10 and 1.20 seconds. Non-parallel or irregular surfaces are also valuable in the design of the music room, because they help to control beneficial and harmful sound reflections.

The Auditorium

From an acoustical standpoint, the auditorium represents a specialized problem in school planning. It must be flexible enough to be used for orchestral and choral presentations, for vocal and instrumental solos, for sound motion pictures, and for the essentially distinct requirements of drama and speech. In many localities it must be designed functionally and esthetically not only to serve the needs of the school, but also to fill a definite need in the life of the community.

Today the auditorium can be basically planned to have excellent acoustics for all its varied uses. Experience has taught new and more efficient methods of design so that the errors commonly made a few years ago of using excessive amounts of sound-absorbing materials, or of distributing those materials over surfaces where they were least effective, can now be avoided. The new approach is one of planning interior shape in relation to the selection and placement of acoustical materials so that a pleasing and natural character of reverberation will be achieved by controlling the destination and dispersion of beneficial and harmful sound reflections. On this basis, even such inferior outline shapes as cylindrical rooms can be planned with remarkable success acoustically, as exemplified by the design of the Voder Room in the American Telephone & Telegraph Building at the New York World's Fair, shown in Fig. 4. Through

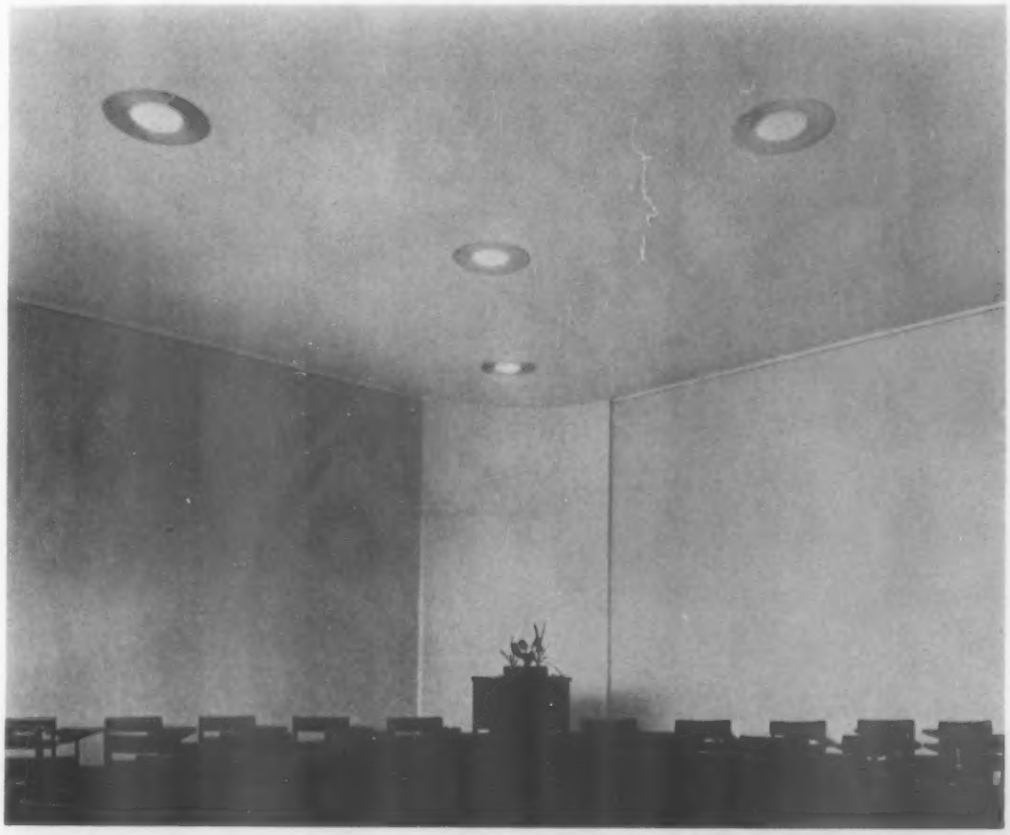


Fig. 3—Classroom for Recitation and Oral English, Ralph Waldo Emerson Junior High School, West Los Angeles, Calif.

Architect—Richard J. Neutra

Reprinted from Architectural Record by permission of architect

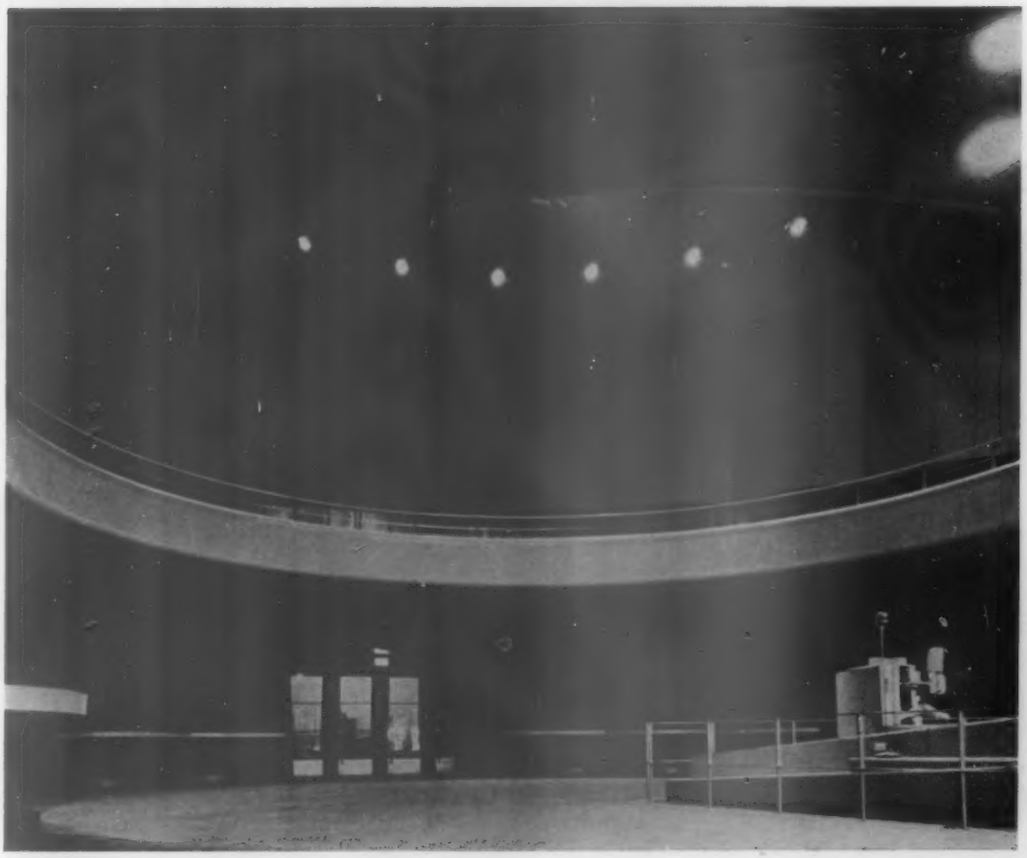


Fig. 4 — The Voder Room, A. T. & T. Exhibit Building — New York World's Fair, 1939

Architects—Voorhees, Walker, Foley & Smith

Interior design—Henry Dreyfuss

Acoustical consultants—Electrical Research Products Inc.

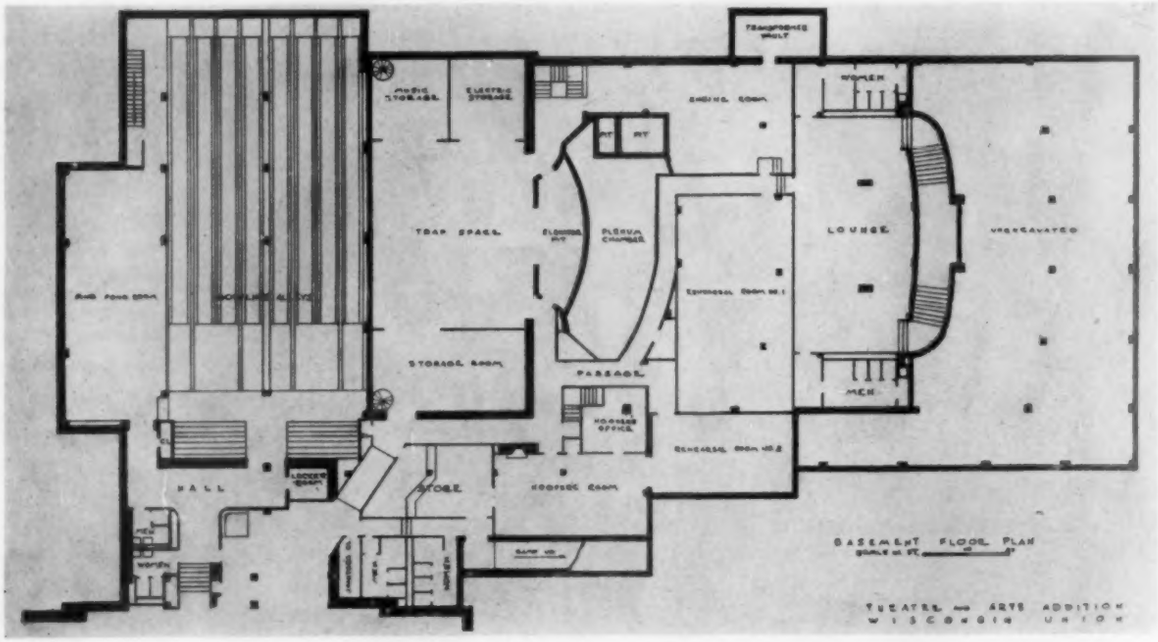


Fig. 5

the use of convex curvatures and sloping planes, the interior form of this room was coordinated with a non-uniform arrangement of sound-absorbing material widely distributed over the surfaces, so that excellent listening conditions were achieved even though the basic concave shape was a most undesirable one acoustically.

In planning the school auditorium, the length dimension should not be less than seven-fifths nor more than twice the width dimension, and the enclosed volume should preferably be not greater than 150 cubic feet per seat. Interior surfaces should be shaped to control sound reflections, and this can often be done through the use of angular, convexedly curved or splayed forms in design, carefully arranged with respect to the source of sound and to the absorbent areas.

When upholstered seats are used and aisles are carpeted, single-floor auditoriums seating up to approximately 750 persons and balcony-type audi-

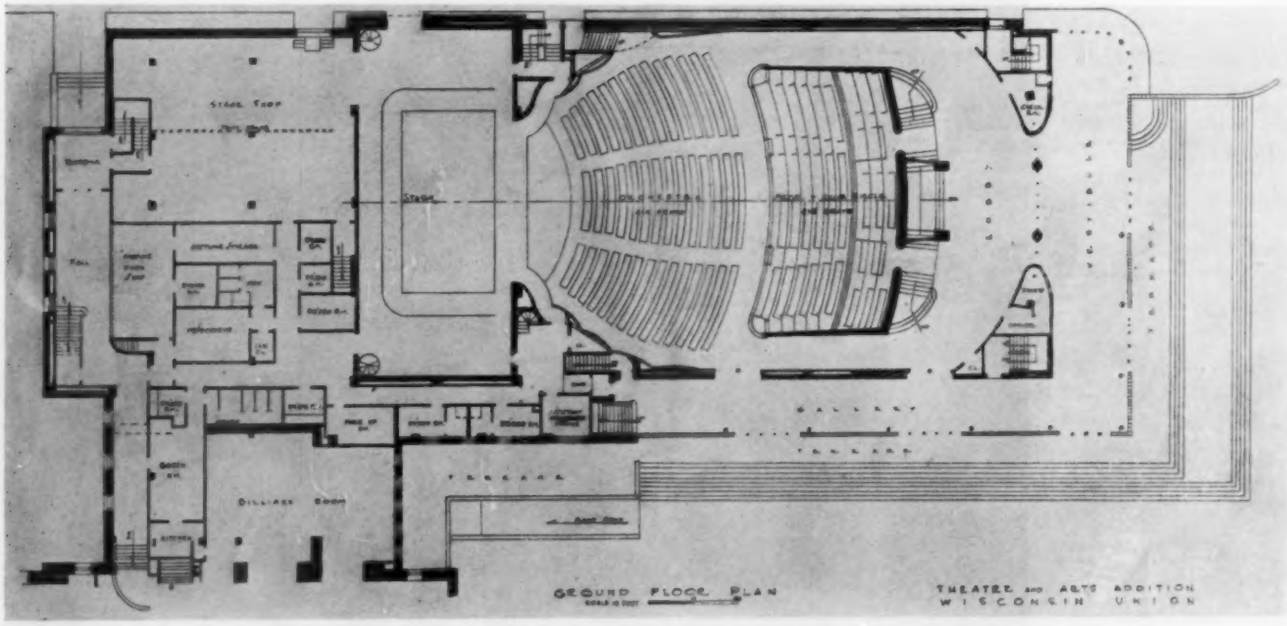


Fig. 6

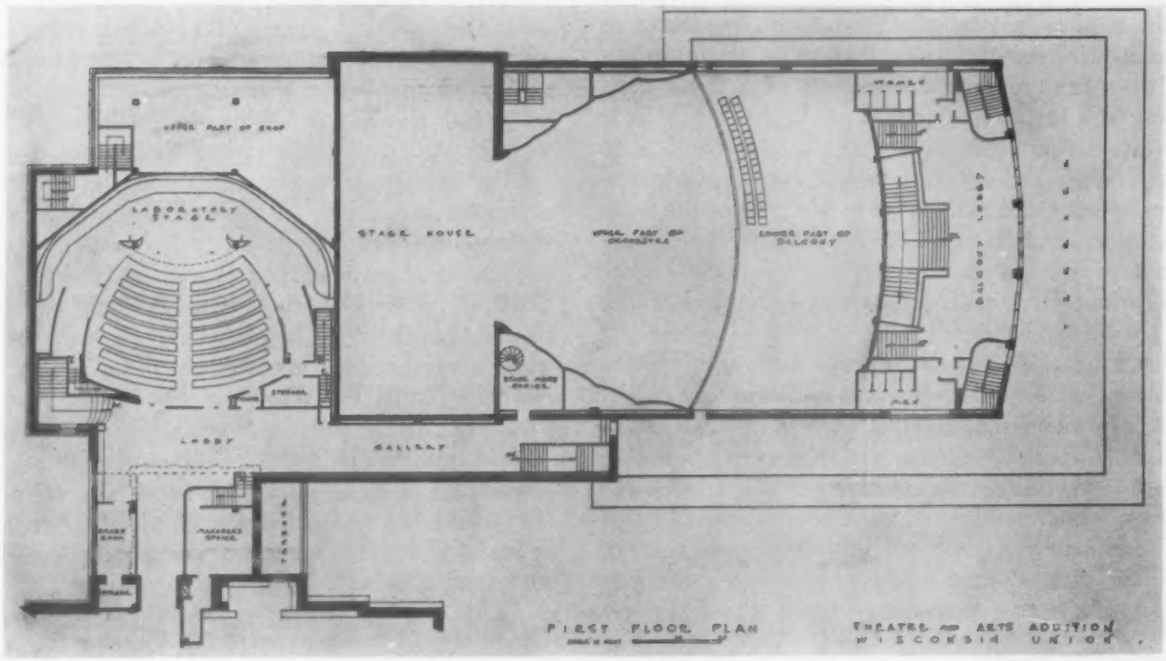


Fig. 7

toriums seating up to approximately 1,500 persons can often be planned to control sound efficiently through shaping alone and without the need for sound-absorbing materials. Since plain wooden seats having very little sound absorption are frequently used in the school auditorium, the installation of acoustical materials is usually necessary to ensure that hearing conditions will be satisfactory when the auditorium is only partially filled.

The material or combination of materials used should generally have its highest sound-absorption value at the low and middle range of frequencies, tapering off in absorption at the high frequencies. This acoustical treatment must be carefully placed and arranged in relation to interior form so that no large areas or single surfaces are completely covered with the material.

Figures 5, 6, 7 and 8 show plans, at various levels,

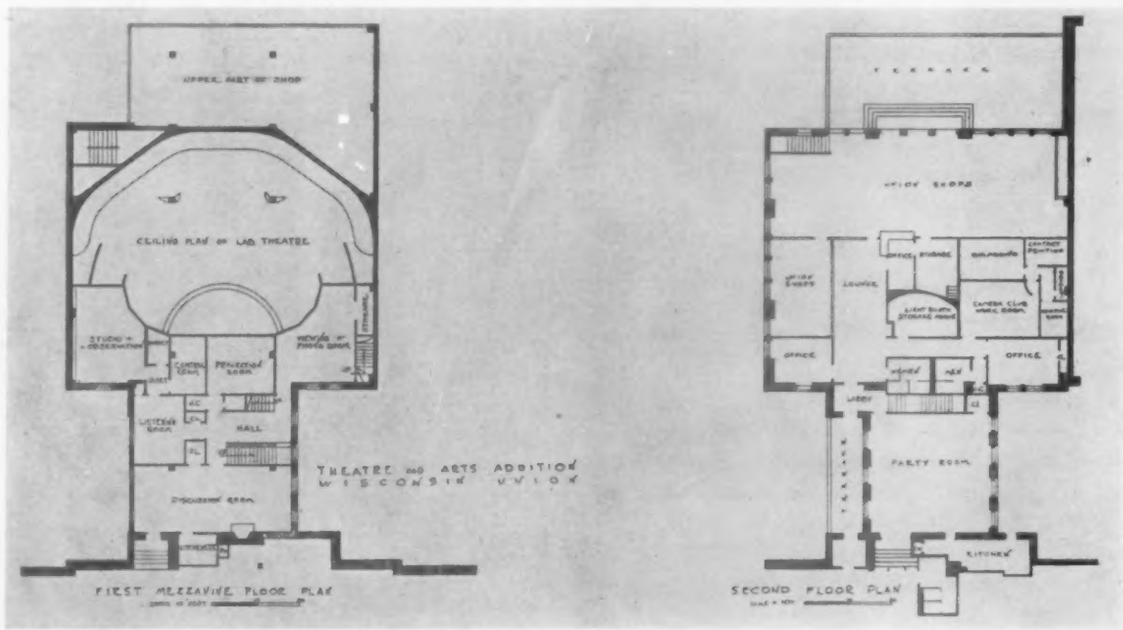


Fig. 8

of the Theatre and Arts addition to the Memorial Union at the University of Wisconsin.* This is an unusually interesting design because of its flexibility and the wealth of resources it offers, both to the University and to the community.

In the design of the entire building, probable noise sources, such as bowling alleys and rehearsal rooms in the basement, a stage shop to the rear of the large auditorium, and shops on the second-floor level, were efficiently isolated structurally and acoustically from areas where quiet conditions are of prime importance for satisfactory work.

The interior shape of the large auditorium is coordinated with a non-symmetrical arrangement of sound-absorbing materials in such a manner as to provide the best hearing conditions that can be achieved in a single space to be used for concerts, recitals, sound motion pictures and lectures. This auditorium may be reduced in size to two-thirds or one-half its total capacity, depending upon the percentage audience expected at various times and the purpose for which it is to be used. A unique feature is a section of the seating area at the rear, divided from the main auditorium by a double glass soundproof partition which can be opened or closed at will. This space is equipped with radio and loudspeaker facilities, so that it can be used for instruction of a class during stage performances or to serve as a monitoring room for radio broadcasts originating in the auditorium.

The small auditorium, or laboratory theater, is also especially interesting, unusual and flexible from an acoustical standpoint. It is designed not only for experimental work in study of the drama, but also for use as a broadcasting and recording theater and a lecture hall. This small auditorium differs from the conventional type in that the fixed proscenium opening is eliminated and the stage is extended to the sides of the seating area. Through the use of sliding partitions the side sections can be closed off when a conventional arrangement is desired.

The walls of the stage are tilted back from the vertical, and the entire ceiling is convexedly curved. This shaping is planned in conjunction with a careful placement of sound-absorbing materials to control the destination and dispersion of sound reflections in order to render the auditorium acoustically correct for all intended uses.

The Promise of the Future

It is interesting to look back over the past forty years and observe how the technical advances in educational methods, architecture and sound control, coupled with increasingly large centers of population, have developed the little red schoolhouse into our modern institutions of learning. It will be equally interesting to follow the further developments into the future and to try, each one for himself, to visualize and predict the type of institution that will be educating the student in 1980.

* Ed. Note:—
Project designer, Michael M. Hare;
Theater consultant, Lee Simonson;
Architects, Corbett and MacMurry;
Acoustical consultants, Electrical Research Products Inc.

PLANNING SMALL TWELVE-GRADE SCHOOL BUILDINGS FOR MULTIPLE SERVICE

By

KNUTE O. BRODY and MERLE A. STONEMAN

University of Nebraska University of Akron

IN the planning of any small twelve-grade school building, there are certain conditions of which account should be taken:

(1) Facilities must be provided for an educational program potentially as broad as that made available in the large school, even though the number of students enrolled is limited and the correspondingly small faculty is rarely trained in all the areas that should be taught.

(2) Even with the diversified program to be provided within a relatively small space, the per-pupil cost of the school plant must not be out of line with that of large schools. In fact, it may even be necessary that such costs be considerably lower than in the large school.[1]

(3) There is generally an unusually close connection between school and community in small centers of population and rural areas. In some instances, the school building is one of the few structures, if not the only one, in the school district that is suitable or even available for public use. On this account, it is often desirable that the school building be planned to provide the meeting place and equipment for most, if not all, of the community's group activities. A double benefit redounds from such planning—a closer community connection with and consequent interest in the school, and economy resulting from maximum use of the school-plant facilities. It may be necessary, though, to increase or at least adapt the space and equipment of the school building because of community use.

In order to take account of the first two of the conditions in small schools discussed immediately above, it seems necessary to apply three distinct principles in the planning of each individual building. These principles may be referred to as flexibility, multiple supervision, and multiple use of space provisions.[2]

The Principle of Flexibility

Flexibility in a school building is achieved when construction is planned so as to permit adjustments to space needs, not only at some indefinite future time, but also at any time and without undue and expensive changes. Flexibility is, however, a broad term, and it should be pointed out that there is more than one type of flexibility to be considered. The two following types are suggested as significant:

1. *Devices to change space provisions at any time.*—Occasionally it is found that provisions for larger or smaller rooms than are regularly available are needed from time to time. When these can be provided without actually building additional rooms or changing permanent partitions, a real economy is realized.

2. *Construction planned to make possible future additions to the building or to make changes of partitions possible.*—It is difficult, if not impossible, to foresee accurately the educational needs of a community; hence the desirability of the type of flexibility here referred to.

The Principle of Multiple Supervision

A multiple supervisory unit may be defined as a room or suite of rooms so planned as to permit supervision by a single individual when the occasion arises, the unit serving as the locus for more than one type of activity at the same time. An example of a commonly used multiple supervisory unit is a room divided by a glazed partition, one part of which is utilized as a bookkeeping room or commercial classroom, and the other part of which is given over to typewriting. Other types of multiple supervisory units are dealt with later in this article.

The Principle of Multiple Use

Multiple use of space units has long been recognized as a problem of the small school, and much has been accomplished toward meeting at least the more frequent demands. The provision of a sufficiently broad curriculum in the small school, especially on the secondary level, will require either numerous special rooms, each equipped for a single type of activity, or a smaller number of combination rooms, so planned that somewhat dissimilar activities may be satisfactorily carried on in each of them. The first alternative mentioned is not a satisfactory solution, since if a school attempts to provide special rooms for each significantly different type of activity, either (1) the utilization of many such special rooms is so low as to

[1] Ray L. Hamon, "Functional Planning of the Small-School Plant," *School Executive*, 58:14-17, April, 1939.

[2] "Schools in Small Communities," Seventeenth Yearbook of the American Association of School Administrators, Washington, 1939, p. 189.

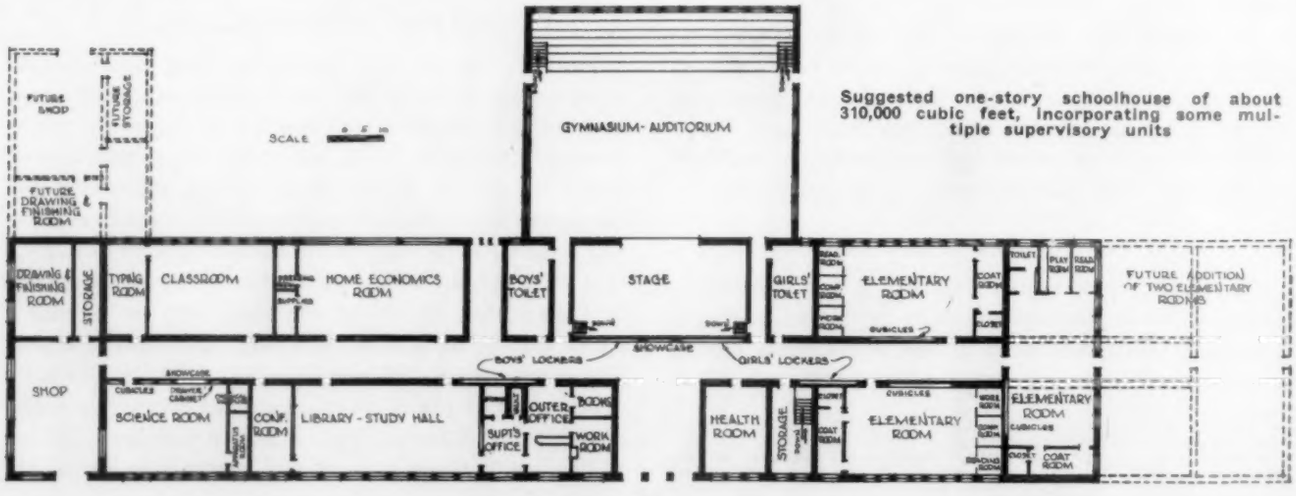
make the expense involved prohibitive; (2) classes in subjects which are assumed to require no special provisions are carried on perforce in rooms not suited to them; or (3) financial restrictions make it necessary to eliminate certain special rooms essential to the offering of a well-rounded course of study. Hence the need for the application of the principle of multiple use of space in small school-building planning.

Application of the Principles

In order to illustrate the application of the principles briefly outlined above, a set of floor plans is included in this article. It must be understood that the authors have no intention of presenting these plans as suitable for unquestioning adoption by a school in which the enrolment is similar to that for which the plans are intended. Rather, the plans have been drawn to fulfill the requirements of a school with definite and specific needs, which are, in the main, typical of small schools in general. To fit any given situation, it is probable that more or less significant changes will need to be made, inasmuch as the requirements to be met vary in degree from school to school.

The plan shown illustrates a one-floor school building intended to serve 60 to 80 pupils in the high school and a similar number in the elementary grades, though a somewhat larger number could be cared for at each level without serious overcrowding. Flexibility is achieved by permitting future additions without undue change of space units already available. Should one or more additional rooms be needed in the high school, they could be secured by making a classroom of the shop, and by combining the storage room and the drawing and finishing room into another small classroom, while constructing a separate shop building. There is, too, the possibility of adding a room on the rear of the present shop, and extending the corridor to the new shop through the area now reserved for a typing room. This does not preclude the use of the stage at times as a classroom, either under the indicated set-up, or as a future contingency. Addition to the elementary school may readily be achieved by extending the corridor through the indicated room and providing one or two additional rooms in the position shown on the plan. No provision is made in the plan for changing space provisions through the use of movable partitions, such need being comparatively rare in a school of this size, although rather frequently met in schools of a yet smaller enrolment. However, such provision could be accomplished by making the partition between the conference room and the library-study hall a folding partition, or by making the same provision between the typing room and its adjacent classroom. In either case an above-standard size room would be rendered available on short notice whenever the need arose.

Multiple supervision is possible at several places in the building. In each of the elementary rooms small sub-units are set off behind glass partitions for use as reading rooms, conference rooms, etc. Such accessory rooms will prove exceedingly valuable in a school of the size with which this article is concerned, because the teacher must have at least two grades in one room, and it is advisable to differentiate class work in these grades in at least some, if not most, of the subjects taught. Hence the opportunity is provided for the group not receiving the immediate attention of the teacher to participate in activities that are desirable but that might otherwise interfere with the work of the other pupils. This is achieved without removing any of the pupils from the general supervision of the classroom teacher. In the section given over to the secondary school the superintendent's office, library-study hall and conference room make up one unit, while the typing room and its adjacent classroom make up a second. The shop and its accessory drawing and finishing room may also be con-



Suggested one-story schoolhouse of about 310,000 cubic feet, incorporating some multiple supervisory units

sidered as a multiple supervisory unit, while a glazed opening between the shop proper and the science room still further increases the possibilities for multiple supervision in that the partition permits a teacher in the science room to supervise activities carried on within the shop when no regularly scheduled class is in that room.

The application of the principles of flexibility and multiple supervision having been indicated in the plan shown, the provision for multiple use, which is the particular concern of this article, now needs to be pointed out. This planning may perhaps best be revealed by discussing in detail each of the locations in the plan where multiple use is intended.

The gymnasium-auditorium provides for use by both the elementary and the secondary school, by the school and the community, and for both types of activity indicated by the name of the unit—that is, physical education and other group activities, and audience situations. The stage, as has been suggested, may serve as a utility classroom, or as a music room for the entire school and community. The toilet rooms are so located that they serve the gymnasium-auditorium during such times as the building proper may be cut off from it. Provision for the high degree of multiple use just indicated precludes low utilization of the space required and makes vital to the community the provision of the gymnasium-auditorium in the school building.

The home economics room is in effect the homemaking department. Since enrolment in a school that is as small as the one under discussion will not justify more space because of consequent low utilization if such space were provided, this one room must serve for all homemaking activities, and perhaps as a recitation room for other classes (such as English or history) as well. It should be noted that the homemaking room is not included in any multiple supervisory set-up, since the types of activities to be carried on therein tend to call for the undivided attention of the teacher and are in and of themselves quite diversified. The same statement could be made in regard to the activities carried on in the shop, the difference being that the shop can scarcely be so planned as to lend itself efficiently to use as a regular classroom; hence the need of providing for supervision from outside the shop proper when it is being only partially utilized.

The type of shop illustrated in this plan is a general or combined general-agriculture shop, the very nature of which assumes multiple use. The science room, as was also true of the home economics room, must serve as a classroom for subjects that do not require extensive special provisions, else the utilization factor is unduly low. The use of both rooms for supervised correspondence study in such schools as utilize this technique of enrichment is in keeping with the principle of multiple use. Supervised correspondence study, it may be stated here, is like regular correspondence instruction except that the work is done by the student during school hours as a part of his regular work load and under the supervision of a member of the school's staff. Using each of the classrooms as a home room, with the possible exception of the shop, eliminates the need for a large assembly hall which would be but inadequately utilized.

Other provisions for multiple use include the use of the same room for both library and study-hall activities, a not infrequent combination in present-day buildings. Another is the utilization of one small room as a teachers' room as well as a health room, to be used for the latter purpose at such times as health services need to be provided. Still another possibility is the use of the workroom adjacent to the school office as a workroom for both pupils and teachers, as well as a meeting place for the board of education.

Conclusion

Small twelve-grade school buildings are numerous in the United States and will continue to be so for many years to come. Consolidation will, on the whole, probably increase the number of such buildings rather than diminish them. Our best efforts should therefore be devoted to planning such structures so that they will facilitate providing an educational program adequate in every way, at a cost that is not excessive. Through the suggestions here presented, it is hoped that some contribution has been made to the achievement of this end.

THE DEVELOPMENT OF THE SCHOOL-BUILDING PROGRAM

for Kanawha County, West Virginia

By M. M. KONARSKI

Charleston, W. Va.; Consulting Architect for the Building Program

THE old-time magisterial and independent district Board of Education disappeared from the educational horizon of West Virginia by an act of the Legislature, and a new County Board of Education, with county-wide jurisdiction, took its place formally on July 1, 1933. The efficiencies and deficiencies of the county unit system of administration have been thoroughly discussed in the past and, needless to say, will be more thoroughly discussed in the future, but the fact remains that Kanawha County, among others in the state of West Virginia, is being administered on a county-wide basis.

Again, whatever the advantages and disadvantages of the old magisterial and independent district administration may have been, conspicuous examples of the shortcomings of this organization have been left in the wake of its demise, particularly in the type and quality of school plants and the lack of equal educational opportunities, when comparing one district with another. Each district was definitely limited in its effort to provide education for the youth by the amounts of assessments and tax levies available within that district, which produced a vicious system of unavoidable discriminations in training the boys and girls for their life work. Poorly paid teachers, total absence or inadequacy of requisite teaching materials and equipment for a full and rich curriculum handicapped the graduates of these schools, when they found themselves in competition for positions with the more fortunate fellow graduates of schools that were located in wealthier districts.

The Right to Equal Educational Opportunities

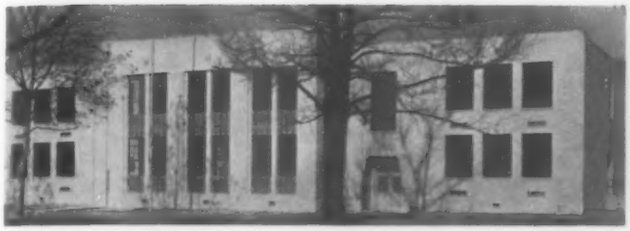
The contrast and discrepancy between the urban and the rural school are too sharp and too wide to be allowed to exist in a democracy, if that democracy is to survive. If "all men are created equal" is a principle of justice in a democracy, then by the same token all youth in the nation deserve to find equal common school opportunities. Many diamonds in the rough can be found in the remotest places, obscure locations, nay, in the very backwoods.

Each year in our land thousands of boys and girls are graduated from common and secondary schools. These have had the opportunity of obtaining an education. There are, surely, many thousands to whom, through no fault of their own, that full opportunity has been denied. The uneducated in a democracy is a liability to himself, to the community. Properly educated youth, the citizenry of tomorrow, trained true to democratic principles, form the solid rock foundation upon which the future may be built, upon which the democratic structure so built may last and survive.

Kanawha County, composed of many old magisterial and independent districts, owned a variety of school plants, from the best in the metropolitan area to the poorest in the more remote agricultural and mining districts. A county area of 914 square miles, with a total population of 160,000 inhabitants, a school population of 51,180 and a school enrolment of 44,797 (both for 1938-39), assessed property valuation of $232,539,575 (as of January, 1938), formed the background for the school-building program. The call included the erection of a number of new buildings, the extensive rearrangement and construction of additions to others, and a number of major alterations and remodeling, a total of 49 units distributed far and wide over the county territory.

Planning the Architectural Program

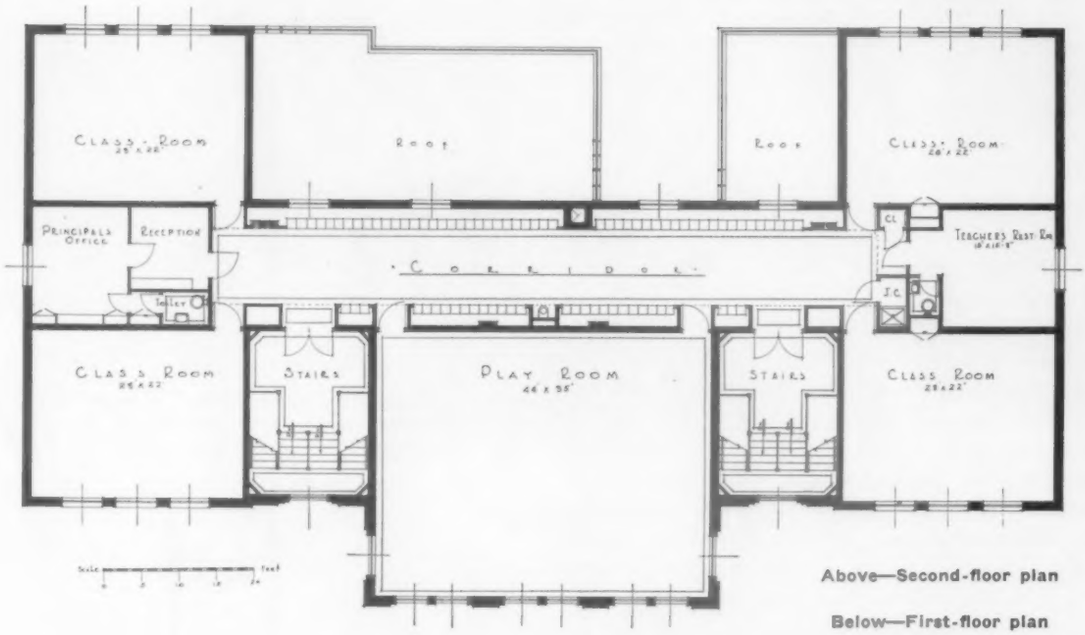
The mechanics of preparing acceptable working drawings and specifications for this program presented some difficulties. Nine architectural firms were chosen by the Board of Education to perform the work. Those retained were as follows: L. T. Bengtson, Herbert S. Kyle, Walter F. Martens, Meanor and Handloser, Montgomery and Patteson, John C. Norman, Tucker and Silling, H. Russ Warne, all of Charleston, W. Va., and Frampton and Bowers of Huntington, W. Va. The task of general planning, coordinating and supervising the building program rested with a consulting architect retained by the Board of Education for the duration of the program, which was estimated to last thirty months. The project architects as well as the consulting architect were retained on a commission basis.



Horace Mann Junior High School, Charleston, W. Va.
For the present used as an elementary school

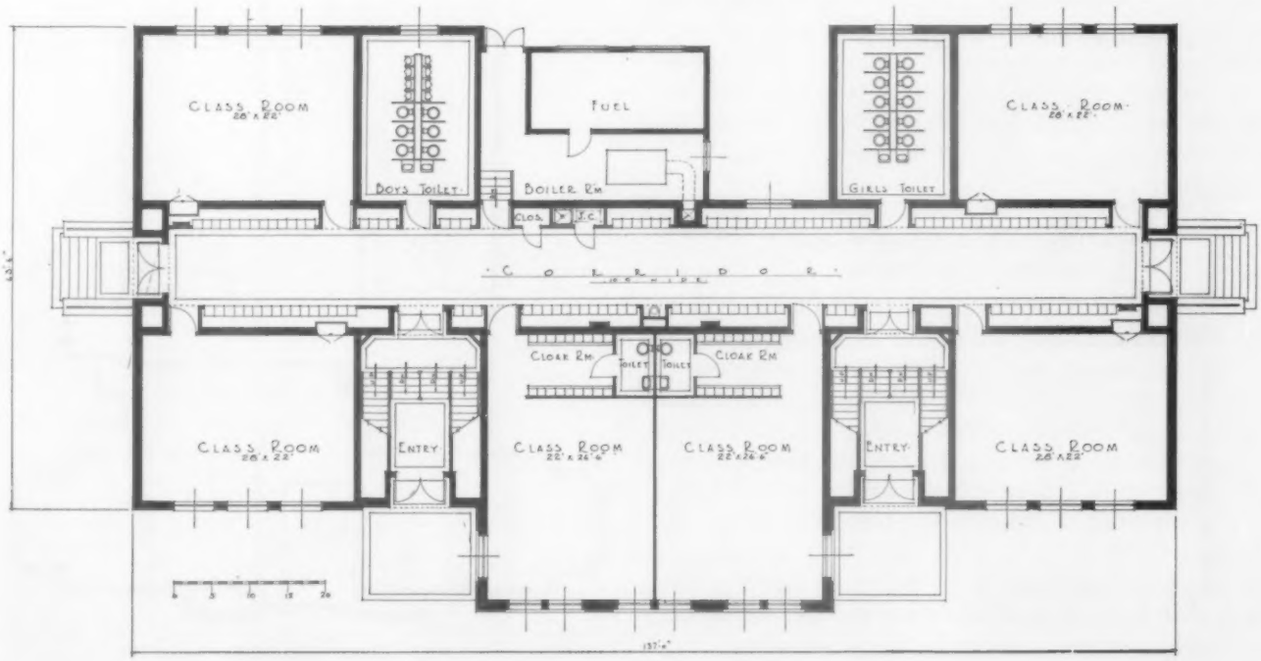
(Meanor & Handloser, Architects;
M. M. Konarski, Consulting Architect)

A typical classroom



Above—Second-floor plan

Below—First-floor plan



All preliminary planning was done by the consulting architect. The preliminary sketches, so prepared in outline form, were based on functional requirements to meet the curriculum in vogue in the school system. The present organization of the school system is based on a six-three-three plan in the metropolitan area and a six-six plan in the outlying territory of the county, with the exception of the so-called "isolated" one-room eighth grade schools in the remote locations, where topography, poor road facilities and a limited population determine automatically the best plan available to the students. With these educational requirements so determined, each project architect was furnished a set of preliminary sketches and a detail outline of the type of construction to be used, including the type and quality of materials to be incorporated in the various structures; in addition, a specific outline of the kind and capacity of heating and ventilating plant based on minimum requirements for adequate heating and ventilation as dictated by the best modern practice; a detail outline of materials and equipment to be included in the installation of all plumbing work, as well as materials, methods and capacities for adequate electric wiring and type and size of lighting fixtures. The layouts for educational equipment and the specifications were handled by the consulting architect with the advice and aid of Virgil L. Flinn, Superintendent of Schools, whose untiring efforts and sustained interest and enthusiasm in this program materially added to whatever success may be hoped for in attaining the objectives sought by the combined efforts of all those concerned in the endeavor. The work so coordinated produced a definite uniformity in all buildings, particularly in details and arrangements with full regard to future maintenance and operation problems, without necessarily producing a stereotype and painful sameness in general treatment and arrangements. There was left ample latitude to the project architect to give full vent to individual taste and ability.

Financing the Building Program in Kanawha County

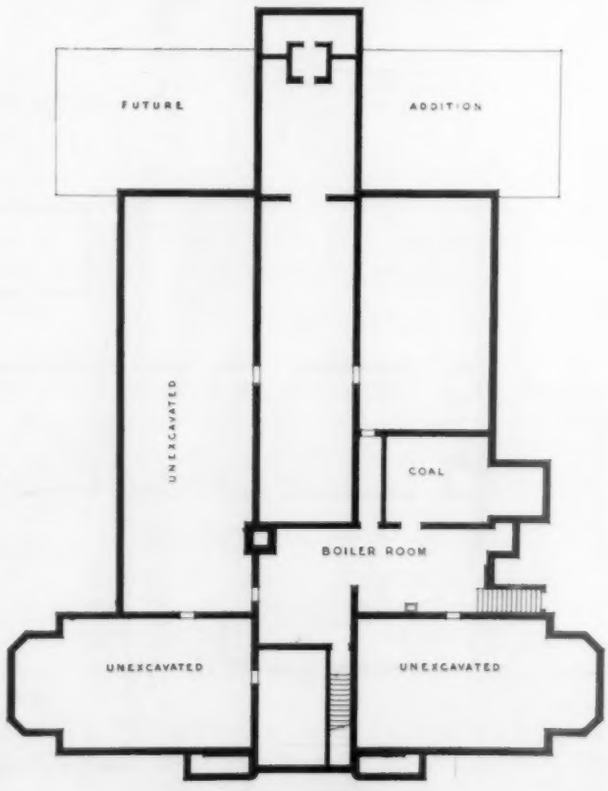
The bond issue of $2,200,000 voted by the citizens of Kanawha County called for a special group to administer the fund, this group to be composed of the five members of the County Board of Education and five representative citizens, all acting as one body on all matters pertaining to the building program. The policies laid down by this body to be followed in the execution of the program, the extensive amount of time freely given by every member, the sound and constructive judgment, advice and council ever present and cheerfully given, deserve the commendation and admiration of every citizen in the community.

Below and on opposite page—

Edison Elementary School
South Charleston, W. Va.

(Montgomery & Patteson, Architects; M. M. Konarski, Consulting Architect)

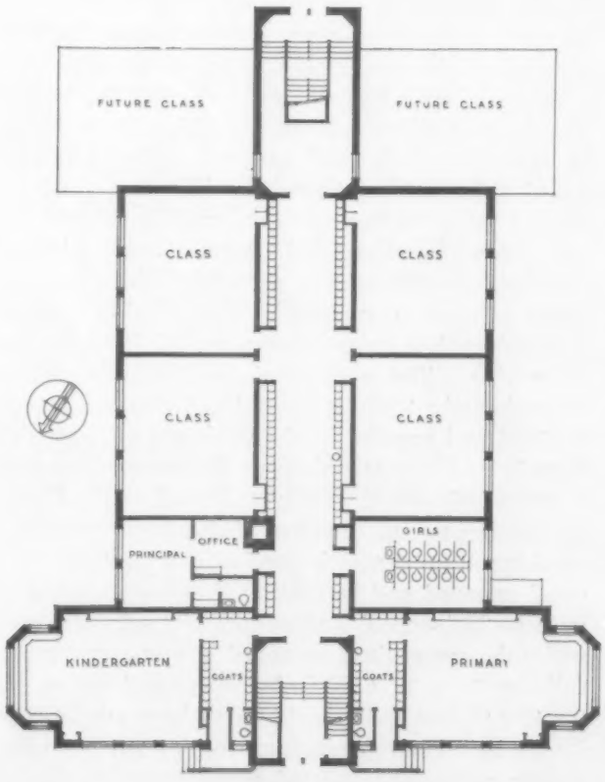
A typical elementary school building. Proper provisions made for future expansion. Note separate entrances for primary children and absence of sub-grade rooms



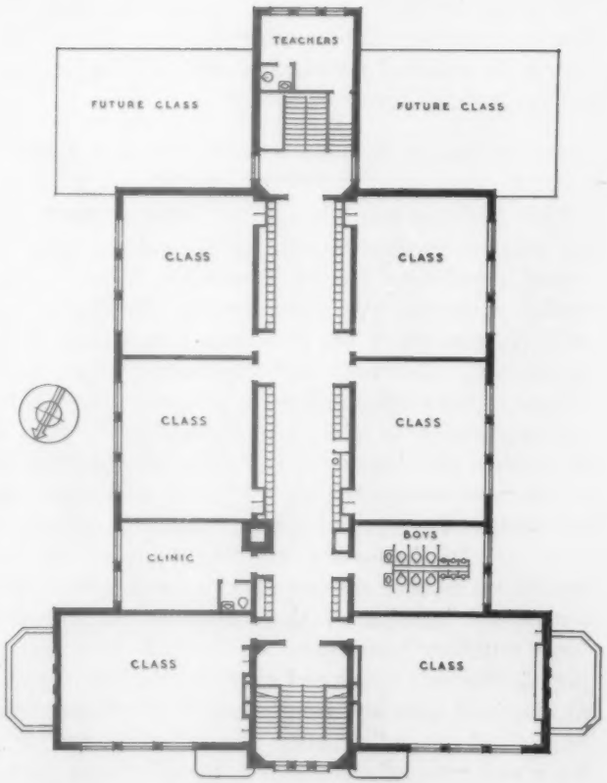
Basement Plan

Left—Typical Corridor
Note door recess preventing door projection into corridor space, allowing free traffic flow

Right—Primary Room
Note bay window for small group instruction. Tables and chairs will be installed in primary rooms. Furniture shown is temporary



First-floor plan



Second-floor plan

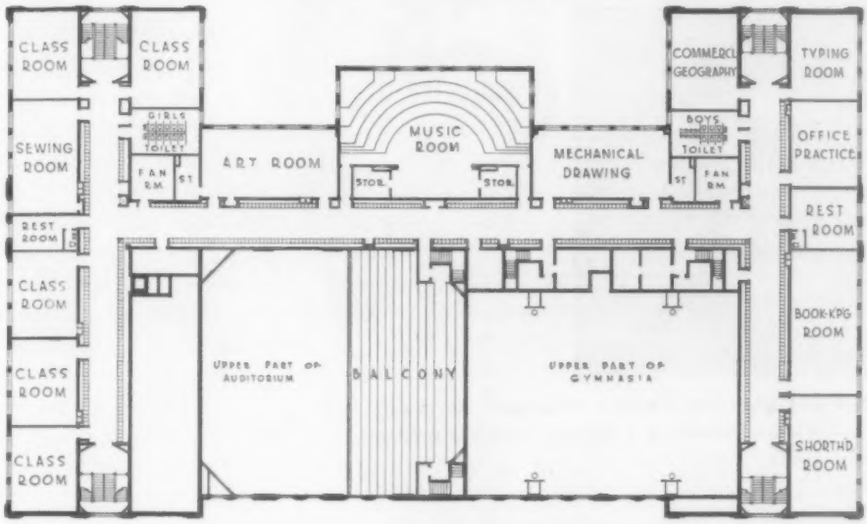
It became evident after a few sample test analyses and estimates that the amounts of funds allocated for each of the 49 units of the program were decidedly short of the amounts necessary for a proper solution of the structural and educational problems. These original allocations would barely provide the four walls and roofs, leaving little, if any, funds for imperative reorganization and remodeling of present structures. The answer to this enigma came in the form of Federal aid through a 45 per cent grant by the Public Works Administration. With a grant amount of $1,724,423 added to the county's $2,107,627, the total $3,832,050 school-building program was launched in the fall of 1938, carried on through 1939, to be completed in the spring of 1940. The unit allocations of money were made for the 49 school locations on the basis of educational requirements and building improvement needs. The recent depression period and ensuing curtailed budgets over a period of years practically stopped all normal work of school replacements and improvements, creating a condition of accelerated depreciation in the buildings, greatly in need of correction. The present program when completed will correct that condition in a number of the existing structures. However, many problems still remain unsolved, which when coupled with the natural industrial growth of the Kanawha Valley and the county, will bring about the need of another building program in the near future.

It would be futile, of course, to attempt to discuss here in detail any large number of the 49 units. Perhaps a discussion of a typical example will be interesting and serve the purpose as well.

The Stonewall Jackson High School and Trade School

This building was planned to provide amply for the present enrolment and for normal increases in school population in the immediate future. Particular attention was given to the circulation and traffic factors which are ever present in a large high-school unit. Note especially the location of the auditorium, gymnasium, cafeteria, library, study halls, and music room in relation to the rest of the plan, so as to avoid long horizontal travel by students to those rooms most frequently visited by all of them. The gymnasium, library, and study halls are in the middle story of the three-story building, to eliminate excessive travel and criss-crossing up and down. The centralized location of these specific rooms, where large numbers congregate during each daily school period, affords a quick and easy distribution of pupils at dismissal time and easy access from all directions at each change of classes. The corridors and stairways and recessed classroom doors allow undisturbed movement of two lines of traffic passing in one direction and two lines moving in the opposite direction without encountering a bottleneck at the usual single-way stairway. Consideration has been given to rooms for groups of activities, such as science rooms, library and study halls, academic classrooms, commercial rooms, trade school, shops, etc. The trade school unit was added to the main building in order to have available for the trade school students all the extra facilities present in a modern high-school building, without the expensive duplication involved if the trade school had been located on a different site.

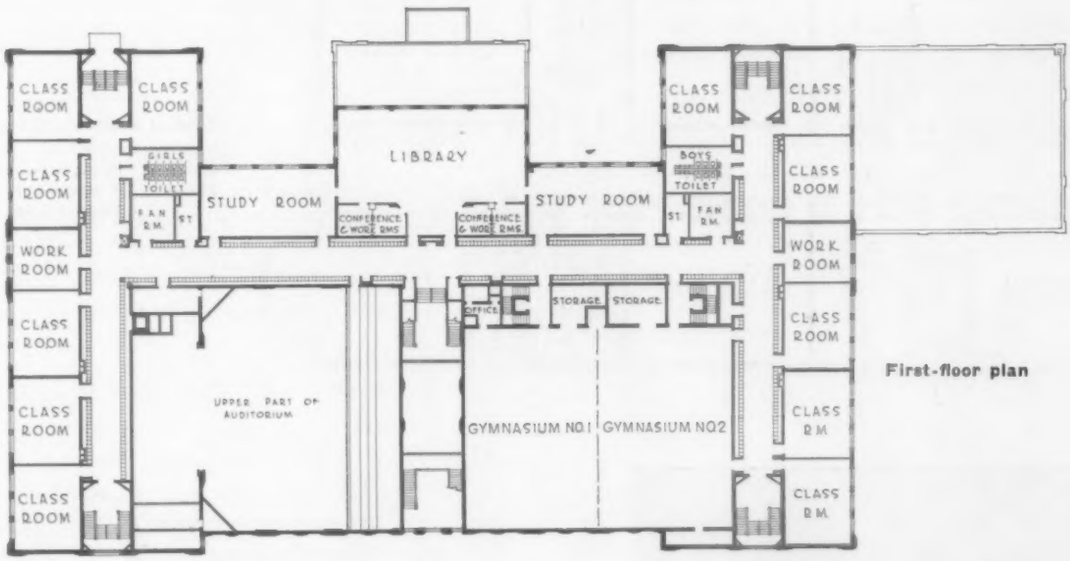
The architectural treatment of the building follows the modern style, the choice and use of the various materials enhancing that effect. The latest development in methods of construction, building practices, materials and equipment were carefully incorporated in the structure. Acoustical treatment is included for corridors, cafeteria, auditorium, gymnasium, library, and music room. The music room has capacity for a full symphony orchestra, and facilities for rehearsals of dramatic productions, as well as ample capacity and arrangement for choral work. The room is well isolated, and is insulated so that the noise of musical endeavors does not permeate the entire building. The library is placed between two large study halls, affording easy communication for the students who wish to make use of the library during study hours. The cafeteria, on the ground floor, affords easy access for deliveries of foodstuffs and supplies, and exit facilities for students to the outdoors when lunch periods are over. An exhaust system of ample capacity, independent of the rest of the building, is installed to exhaust the odor from the cafeteria and the kitchen. The equipment here is so arranged that the room may be used for study hall purposes when additional capacity for study is needed. The two gymnasia, divided by a folding partition, may be thrown into one room for basketball games, and telescopic bleachers provide seating accommodations for spectators without permanently encumbering valuable gymnasium floor space, always needed for daily class instruction. The auditorium and balcony, seating approximately 1,200, is located and planned so as to be filled and emptied in the minimum of time. The stage is readily accessible from the surrounding classrooms, which can effectively and comfortably be used as dressing rooms (because of the large number of participants in dramatic productions) instead of the usual cramped and inadequate dressing rooms of the average high-school auditorium. The locker rooms under the gymnasium, arranged in nests consisting of full-size 12 x 12 x 60-inch lockers and six or nine 9 x 12 x 20-inch individual lockers, have ample capacity for individual gymnasium clothing storage, proper shower rooms and isolated team rooms, so that the evening use of the gymnasium will not disturb the



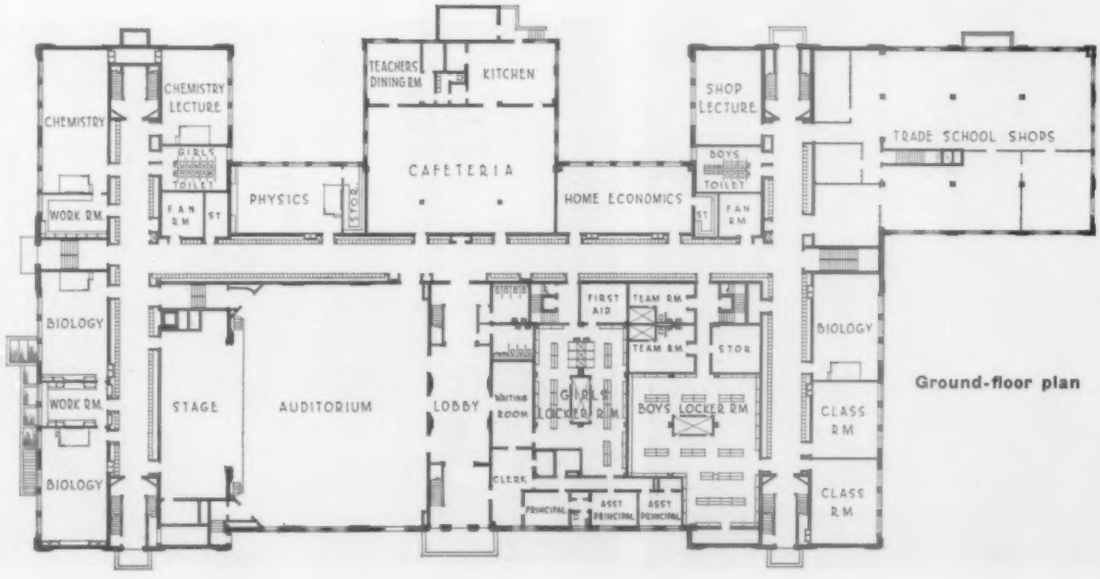
Stonewall Jackson High School
Charleston, W. Va.

Tucker & Silling, Architects;
M. M. Konarski, Consulting Architect

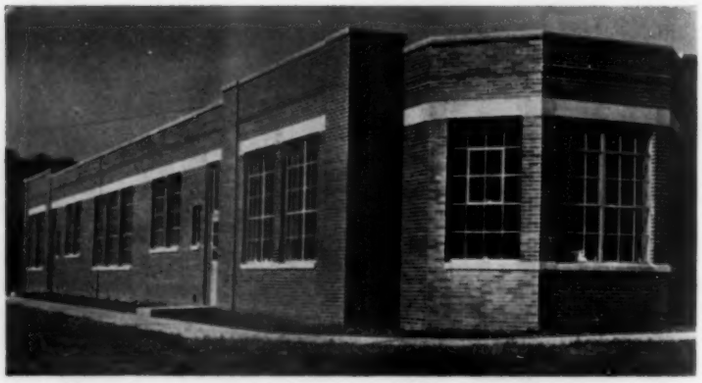
Second-floor plan

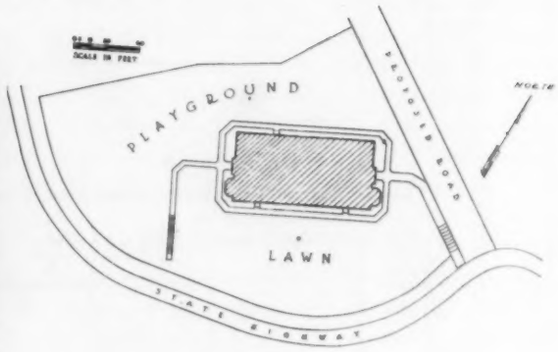


First-floor plan

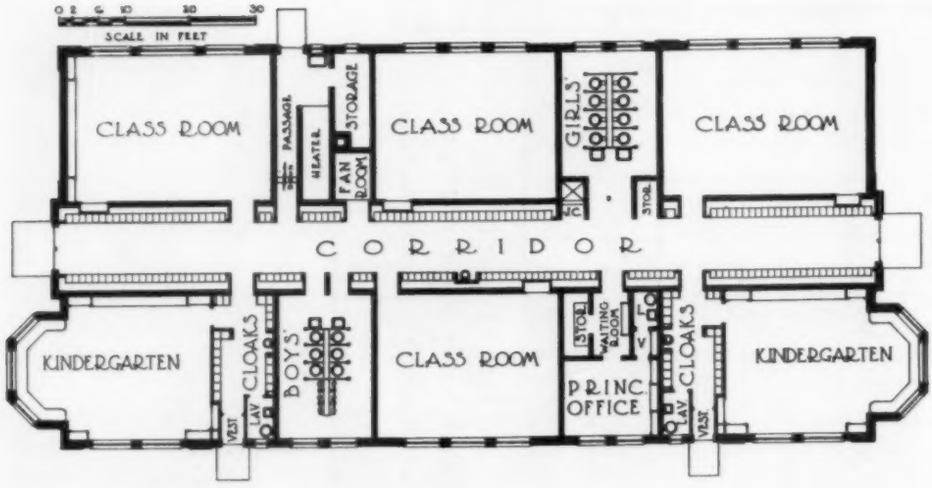


Ground-floor plan

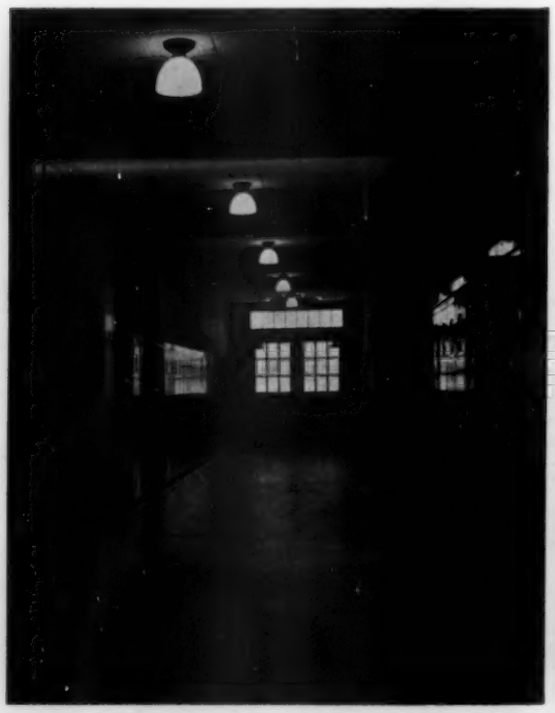




Oakwood Elementary School, Charleston, W. Va.
(Walter F. Martens, Architect; M. M. Konarski, Consulting Architect.)



Typical small elementary school erected in various locations of county. Provisions made for addition of second story when need arises



Left—A typical corridor
Below—The primary room

safety of day school properties. The administrative offices, in the very heart of the building, can easily be reached by the general public as well as the students. Numerous other details can readily be recognized by careful examination of the accompanying plans and illustrations.

The heating and ventilating system is one commonly known as a split steam system. However, due consideration was given to distributing the ventilating air from various zone centers located in terms of exposure, rather than distributing air from one central location. The advantages of this arrangement are obvious to any one confronted with a school ventilating problem.

Toilet facilities and drinking fountains are available for girls and for boys on every floor of the building.

Artificial illumination is provided in every room, based upon minimum recommendations of the Illuminating Engineering Society for correct foot-candle delivery on the working plane of every type of schoolroom.

The new elementary schools were planned to meet basic requirements as they apply to lower grade work. The quality of construction, choice of material and equipment are on the same plane as for high schools, and uniform throughout the county. The new building planning and construction, after all, were relatively simple when compared with the problems of building additions and reorganizing and remodeling old buildings.

Salvaging the Old School Buildings

In every community there are old buildings, with a halo of tradition and history, dear to those who entered and left their portals. A strong wave of antagonism usually develops when a proposal to demolish one of these old structures is publicly presented, sometimes even taking the form of a court injunction. Invariably these buildings are obsolete structurally and educationally when judged by modern standards of evaluation, yet, on the other hand, some of them are too sound structurally to be relegated to the scrap heap. Here an honest and intelligent effort to modernize, reorganize and rejuvenate will produce surprising results. At least a dozen buildings in Kanawha County fell into this category, particularly the old district Senior and Junior High Schools. These buildings, poorly planned, were inadequate to meet the demands of present-day curricula, and the space available was insufficient for rearrangement without expansion. The present old buildings could in almost every case be remodeled to care properly for the academic needs of the high-school organization, and the additions were planned to house the necessary special activity rooms. In this manner desirable results were attained; namely, the salvage of the intrinsic value of the existing structure, thereby reducing John Taxpayer's initial capital investment, and the production of a new ensemble which not only meets the demands of the curriculum but incorporates all the modern conveniences and improvements which our present living standards make mandatory.

Commercial organizations have found this procedure desirable and economical; there is little reason why this scheme of treatment cannot be applied to public buildings, particularly schools, in order to gain the accruing benefits. Moneys saved by salvage can readily and profitably be allocated for additional facilities, educational equipment and supplies always welcomed by the school administrator.

Thus the elimination of former inequalities and deficiencies in the school plants will hasten the gradual elimination of district boundary lines; and the erection of new buildings of uniform quality and type structurally and educationally, the reorganization, remodeling and rejuvenating of those plants worth salvaging, and the construction of additions and improving conditions of present buildings, furnishing the necessary facilities and uniform equipment throughout the county, will give *all* the boys and girls of the county of Kanawha equal opportunities to acquire training based on the same curriculum that is uniformly applied throughout the county school system.

MECHANICAL AND ELECTRICAL ENGINEERING CONSULTANTS FOR UNIVERSITY AND SCHOOL PROJECTS

The following directory is restricted to Mechanical and Electrical Engineering Consultants who are in independent professional practice and have actually been identified with a number of university or school projects.

Space limitations permit only three listings for each individual or firm and preclude mentioning the name of the architect associated. The following abbreviations are used throughout: h (heating), v (ventilating), p (plumbing), ac (air conditioning), e (electrical), l (lighting), m (mechanical), pp (power plant).

CALIFORNIA

Robt. M. Storms, 816 W. Fifth St., Los Angeles
Visalia Junior College, Visalia (*h, v, p, ac*)
Corcoran Union High School, Corcoran (*h, v, p, ac*)
Woodrow Wilson Junior High School, Glendale (*h, v, p*)

Clyde E. Bentley, 216 Pine St., San Francisco
Mt. Diablo Union High School, Concord (*e, l*)
Benicia Grammar School, Benicia (*e, l*)
Lemoore Union High School, Lemoore (*e, l*)

Hunter & Hudson, 41 Sutter St., San Francisco
Hoover War Library, Stanford University (*h, v, ac, p, e*)
Social Sciences and Life Sciences Groups, University of California at Los Angeles (*h, v, ac, p, e*)
Science Bldg., San Mateo Junior College, San Mateo (*h, v, p, e*)

CONNECTICUT

Hubbard, Rickerd & Blakeley, 275 Orange St., New Haven (also at Boston, Mass.)
Connecticut College for Women, New London (*boilers, turbo and diesel engine generators*)
Sterling Library Addition, Yale Medical School, New Haven (*ac*)
High School, Brattleboro, Vt. (*h, e, p*)

DISTRICT OF COLUMBIA

M. F. Hoppe, 1621 Connecticut Ave., Washington, D. C.
Bunker Hill Elementary School, Washington, D. C. (*h, v*)
Takoma Park Junior High School, Montgomery County, Md. (*ac, v, p, e*)
Parkside School, Montgomery County, Md. (*ac, v, p, e*)

Thomas H. Urdahl, 726 Jackson Place, N.W., Washington, D. C.
Bancroft School Addition, Washington, D. C. (*h, p, e*)
Benjamin Franklin High School, Norwalk, Conn. (*h*)
National Education Association, Washington, D. C. (*h, p, v, e, elevators*)

ILLINOIS

Irving E. Brooke, 189 W. Madison St., Chicago
Board of Education, Winnetka (*h, v, p, e*)
Board of Education, Waukegan (*h, v, p, e*)
Wichita High School, Wichita (*h, p, v, e*)

Robert E. Hattis, 820 N. Michigan Ave., Chicago
Scott Hall, Northwestern University, Evanston (*h, v, ac, e, refrig.*)
Arlington Heights High School, Arlington Heights (*h, v, e, p, pp*)
Grays Lake High School, Grays Lake (*h, v, pp*)

John Howatt, Board of Education, 228 N. LaSalle St., Chicago
Lane Technical High School (*h, v, p*)
South Side Vocational High School (*h, v, p*)
Oakenwald Elementary School (*h, v, p*)

George W. Hubbard, Railway Exchange Bldg., Chicago
Elementary School, Flossmoore (*h, p*)
Parochial schools including St. Ferdinand in Chicago, SS. Faith, Hope and Charity in Wilmette, Notre Dame High School in Chicago (*h, p, v*)
St. Mary of the Lake Seminary, Mundelein (*h, p, l, boiler and generating plant, sewage disposal plants, wells and water distribution system*).

Samuel R. Lewis, 407 S. Dearborn St., Chicago
Girls Trade School and Vocational High School, Toledo, Ohio (*h, v*)
Gregory Hall and Illinois Union, Urbana (*h, cooling, p, e*)
High School, Hinsdale (*remod. boilers, oil burners, pumps, etc.*)

Neiler, Rich & Co., 431 S. Dearborn St., Chicago
New Public Administration Building, University of Chicago
Goodspeed Hall, University of Chicago
Men's Residence, Northwestern University, Chicago

INDIANA

Charles R. Ammerman, Century Building, Indianapolis
Public School No. 91, Indianapolis (*m, e*)
Women's Dormitory North Building, Indiana University, Bloomington (*m, e*)
Women's Dormitory East Building, Indiana University, Bloomington (*m, e*)

IOWA

B. E. Landes, Hubbell Building, Des Moines
Women's Gymnasium, Iowa State College, Ames (*h, v, p, e*)
Two Junior High Schools, Mason City (*h, v, p, e*)
High School, Fairfield (*h, v, p, e*)

M. L. Todd, 1111 Independence Ave., Waterloo
Longfellow School, Waterloo (*h, v*)
New Hampton High School, New Hampton (*h, v*)
Frances Grout School, Waterloo (*h, v*)

MASSACHUSETTS

Hubbard, Rickerd & Blakeley, 110 State St., Boston (also at New Haven, Conn.)
Westwood High School, Westwood (*h, v, p, e*)
Branford High School Addition, Branford, Conn. (*h, v, p*)
East Haven High School, East Haven, Conn. (*h, v, p*)

William A. McPherson, Department of School Buildings, 26 Norman St., Boston
Addition to Practical Arts High School (*h, v*)
Addition to W. H. Taft School (*h, v*)
Addition to R. G. Shaw Junior High School (*h, v*)

Office of G. K. Saurwein, Lehman Hall, Cambridge
Harvard Medical School Power Plant, Boston (*entire project*)
Harvard University, Cambridge (*fire protection, h, v, ac, e, steam distribution underground systems*)
New England Conservatory of Music, Boston (*automatic h controls, pp problems*)

Frederick D. B. Ingalls, 1 Hopkins St., Reading
Reading Grade School, Reading (*h, v*)
Student Activities Building, Worcester Polytechnic Institute, Worcester (*h, v*)

MICHIGAN

George H. Giguere, 17205 Fairport St., Detroit
Northside School, Ann Arbor (*h, v*)
Ann Arbor High School Addition, Ann Arbor (*h, v*)

Snyder & McLean, Penobscot Building, Detroit
Michigan State College Auditorium, East Lansing (*h, v, p, e, l, sound and public address*)
Mackenzie High School Addition, Detroit (*h, v, p, e, m and e equip.*)
Western State Teachers College, Men's Dormitory, Kalamazoo (*h, v, p, m and e equip.*)

Ray S. M. Wilde, 194 Connecticut St., Highland Park
Cranbrook School for Boys, Bloomfield Hills (*m, e*)
Kingswood School for Girls, Bloomfield Hills (*m, e*)
Michigan Union Dormitory, Ann Arbor (*m, e*)

MINNESOTA

Charles Foster, Medical Arts Building, Duluth
Addition to Franklin School, Duluth (*h, v, p, e*)
Remodeling of Central High School, Duluth (*h, v, p, e*)
Gymnasium, Auditorium and Class-Room Addition to Tower School, Tower (*h, v, p, e*)

A. L. Sanford, Empire Bank Building, St. Paul
Wallace Hall Dormitory, Macalester College, St. Paul (*h, p, e*)
High School, Bloomington (*h, v, p, e, T.C. boiler plant*)
Public Schools, Minneapolis (*h, v, p, elevators, pp*)

MISSOURI

Walter E. Gillham, Law Building, Kansas City
Buildings for the University of Arkansas, Fayetteville (*h, v, p, e*).
Public Schools, St. Joseph (*h, v, p, e*)
Public Schools, Tulsa, Oklahoma (*h, v, p, e*)

John D. Falvey, 316 N. 8th St., St. Louis
Culver Military Academy, Culver, Ind. (*pp, m*)
High School, Wellston (*h, v, p, e*)
Lanphier High School, Springfield, Ill. (*h, v, e, p*)

NEW JERSEY

Pecring and Remington Company, 509 Cooper St., Camden
Druid Drive School, Baltimore, Md. (*h, p, e, structural*)
McDonogh School, McDonogh, Md. (*sewage treatment plant*)

NEW YORK

Beman & Candee, 374 Delaware Ave., Buffalo
Kenmore Senior High School, Kenmore (*h, v, p, e*)
Belknap & Hawley Schools, Lockport (*h, v, p, e*)
Brocton Central School, Brocton (*h, v, p, e*)

Thomas F. Dwyer, Board of Education, 49 Flatbush Ave. Ext., New York
Wm. H. Taft High School, New York (*h, v, m*)
Brooklyn High School for Homemaking, New York (*h, v, m*)
William Cullen Bryant High School, New York (*h, v, m*)

Dwight D. Kimball, Grand Central Building, New York
Andrews Memorial School, Bristol, R. I. (*h, v, p, e*)
Myron Taylor Law School, Cornell University, Ithaca (*h, v, p, e*)

Alfred J. Offner, 139 East 53rd St., New York
Hotchkiss School, Lakeville, Conn.
Lawrenceville School, Lawrenceville, Conn.
Junior-Senior High School, Rye (*h, v, ac, e, p*)

Sullivan A. S. Patorno, 101 Park Ave., New York
Boys Dormitory and Field House, Gould Academy, Bethel, Maine (*h, v, p, e*)
MacCracken Hall Addition; Dramatic School and Recreation Building, Sarah Lawrence College, Bronxville (*h, ac, p, e*)
Gymnasium Building, Kent School, Kent, Conn. (*h, v, oil burning equip.*)

Syska & Hennessy, 420 Lexington Ave., New York
Long Beach Junior-Senior High School, Long Beach (*h, v, p, e*)
University of North Carolina Chemistry Building, Raleigh (*h, v, p, e, elevators*)
Hillside High School, Hillside N. J. (*h, v, p, e*)

Stanley C. Stacy, Board of Education, 13 South Fitzhugh St., Rochester
John Marshall High School (*h, v, p, e*)
No. 4 School (*h, v, p, e*)
Junior Vocational School (*h, v, p, e*)

Harold L. Alt, 115-27 225th St., St. Albans
North Side High School, Newark, N. J. (*h, ac, v*)
Shanghai American School, Shanghai, China (*h, p, boiler plant*)
Schenley High School, Pittsburgh, Penna. (*h, v, boiler plant*)

A. R. Acheson, Eckel Theatre Building, Syracuse
Addition to Steam Station, Syracuse University (*e, boiler, extension of coal handling equip.*)
Marcellus Central High School, Marcellus
Ogdensburg High School, Ogdensburg (*h, v, e*)

E. Arnold Vivarttas, 154 Main Ave., West Brighton
Manual High School, New York (*h, v*)
Needle Trades High School, New York (*h, v*)
Midwood High School, New York (*h, v*)

OHIO

A. M. Kinney, Inc., Carew Tower, Cincinnati
Denison University, Granville (*pp, h, p, e*)
Lincoln Grant School, Covington, Ky (*m*)
Mount Washington School, Cincinnati (*m*)

O. W. Motz, 920 E. McMillan St., Cincinnati
Student Union, University of Cincinnati (*h, v, temp. control, e*)
Addition to Chemistry Building, University of Cincinnati (*h, v, temp. control, e*)
Junior and Senior High School, Mariemont (*h, v, temp. control, e, p*)

John Paul Jones, Cary & Millar, Terminal Tower, Cleveland
Girls Gymnasium, Oberlin College, Oberlin (*h, v, p, e*)
Hall Auditorium, Oberlin College, Oberlin (*h, v, p, e*)
Additions to Rayen and Scienceville High Schools, Youngstown (*h, v, p, e*)

OREGON

Thomas E. Taylor, Postal Building, Portland
Chemistry Laboratory, Oregon State College, Corvallis (*h, v, p*)
Senior High School and Gymnasium, Natatorium District No. 9, Coos County, Marshfield (*h, v, p, swimming pool*)
Addition to High School, District No. 2, Multnomah County, Gresham (*h, v, p, e*)

PENNSYLVANIA

Harry B. Joyce, Commerce Building, Erie
State Teachers College, Clarion (*tunnels, steam mains, pp*)
State Teachers College Auditorium Building, Edinboro (*h, v, e*)
State Teachers College, Slippery Rock (*pp*)

Charles S. Leopold, 213 S. Broad St., Philadelphia
Temple University, Unit No. 2 (*h, v*)
Grade School, Reading (*p, h, v, e*)
Joint University Library, Vanderbilt University, Nashville, Tenn. (*ac, h, p*)

George W. Powell, Jr., 112 S. 16th St., Philadelphia
Elkland Boro High School, Elkland (*p, h, v*)
Smithfield Twp. High School, Smithfield Twp., Tioga County (*p, h, v*)
St. Marks Parochial School, Bristol (*h*)

Julian S. Simsohn, 933 N. Broad Street, Philadelphia
Mary Immaculate Seminary, Northampton (*h, v, p, e, sewage disposal, refrig., water supply*)
Athletic Building, School District of Cheltenham Township, Elkins Park (*m*)
The Academy of the New Church, Bryn Athyn (*boilers, stokers, boiler plant aux. installation*)

RHODE ISLAND

John J. McCarthy, Providence Public School Department, 20 Summer St., Providence
Hope High School (*h, v*)
Mount Pleasant High School (*h, v*)
Nathanael Greene Junior High School (*h, v*)

TEXAS

Kribs & Landauer, Dallas Gas Bldg., Dallas
Physical Education Building, Palestine (*p, h, e*)
Alterations to Lamar Elementary School, Palestine (*p, h, e*)
University Park School Addition, Highland Park Independent School District, Dallas (*p, h, e*)

H. W. Skinner, 4816 Dexter St., Fort Worth
School Buildings for the Fort Worth Independent School District (*p, h, e*)
State Board of Education, Baton Rouge, La. (*pp, and distribution system*)

R. K. Werner, W. T. Waggoner Bldg., Fort Worth
Buildings at Louisiana State Normal College, Natchitoches (*h, v, p, e*)
Buildings at Louisiana Polytechnic Institute, Ruston (*h, v, p, e, ac*)
High School Stadium, Fort Worth Independent School District (*p, h, e*)

Reg. F. Taylor, Bankers Mortgage Bldg., Houston
University of Houston, Houston (*p, h, e, ac*)
Bossier City High School, Bossier City, La. (*h, p, e, v*)
Ruston High School, Ruston, La. (*h, p, e, v*)

WASHINGTON

Lincoln Bouillon, 1411 Building, Fourth Ave., Seattle
Bellingham Senior High School, Bellingham (*m, e*)
Social Science Building, University of Washington, Seattle (*m, e*)
Training School Building, Central Washington College of Education, Ellensburg (*m, e*)

C. W. May, Smith Tower, Seattle
College of Puget Sound Womens Dormitory, Tacoma (*h, v, p, ac*)
Puyallup High and Intermediate Schools, Puyallup (*h, v, p, ac*)
Chemistry and Science Building; Steam Electric Power Plant for Washington State College, Pullman (*h, v, p, ac*)

C. G. Zokelt, 3810 24th Ave. South, Seattle
Anchorage Grade School and High School Additions, Anchorage, Alaska (*h, v, p, e*)
Longview Grade and High School Additions, Longview (*h, v, p*)
Mount Vernon Grade School, Mount Vernon (*h, v*)

WISCONSIN

G. L. Larson, 1213 Sweetbriar Road, Madison
Biochemistry Building, University of Wisconsin, Madison (*h, v, ac*)
Adams, Roosevelt and Washington Schools, Janesville (*h, v*)
Lapham and Marquette Schools, Madison (*h, v*)

THE TILE-TEX COMPANY

Plant and General Office Chicago Heights, Illinois

EASTERN SALES OFFICE—101 Park Avenue, New York City

Grade School, Mattituck, L. I., N. Y.—William LaFon, Architect, Southampton, L. I., N. Y.

TILE-TEX--THE STANDARD ASPHALT TILE FLOOR FOR SCHOOLS

For the past fifteen years, millions of square feet of Tile-Tex have been installed in school houses throughout the United States. These floors are giving uniformly good service, represent on the average a low investment cost per square foot, and are maintained simply and economically. They represent what we honestly believe to be the greatest value in floors for schools that can be purchased today.

Tile-Tex is designed and manufactured to meet the demand for a low cost flooring that will withstand heavy foot traffic under exacting conditions over a long period of years. Prominent school architects specify it consistently and know that the Company manufacturing it can be relied on to stand behind the material and improve it year after year. Hundreds of Tile-Tex school house floors throughout the country are mute testimony to the quality of the product and the knowledge and skill of the Tile-Tex distributors who install it.

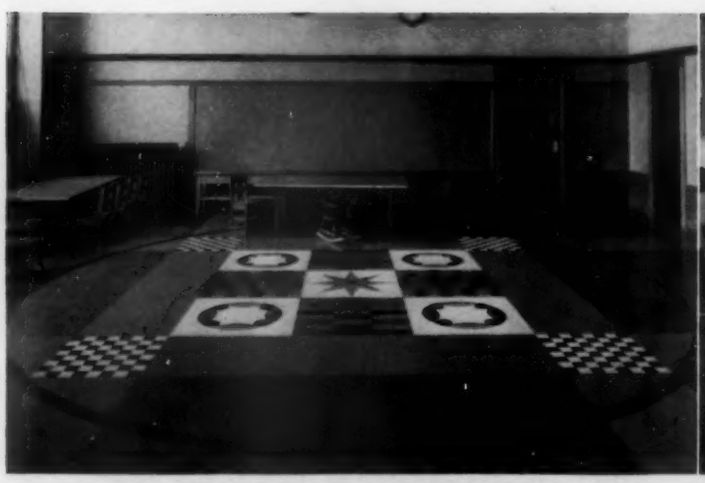
TILE-TEX MEETS THE REQUIREMENTS OF EVERY SCHOOL AREA!

1. ENTRANCE LOBBIES—Striking design possibilities, long-wearing, and non-slip.
2. CORRIDORS—Safe, attractive, easy to maintain, quiet, durable, and economical.
3. CLASSROOMS—Long-wearing, non-distracting to the pupil, easy to keep clean, and suitable for either fixed or movable seating equipment.
4. TOILETS and RESTROOMS—Acid resistant, sanitary, permanent, and easy to clean.
5. AUDITORIUMS—Flexible in design, adapted for ramps and inclines, easy to clean, and durable.
6. LABORATORIES—Acid and alkali resistant, comfortable to stand and walk on, and easy to clean.
7. LIBRARIES — Quiet, comfortable, attractive, and easy to clean.
8. KINDERGARTENS—Safe for children to play on, quiet, adapted to special inserts and game designs, sanitary, and easy to clean.
9. CAFETERIAS and LUNCHROOMS—Easy and inexpensive to maintain, good-looking, long-wearing, and, where necessary, available in Greaseproof colors.
10. OFFICES—Good appearance, durable, quiet, and easy to keep clean.

Tile-Tex is available in four distinct color lines—Economy, Standard, DeLuxe, and Greaseproof—all of the same high quality. The judicious selection of colors to meet the specific requirements of each school area is possible because of these carefully designed color groups. Fifteen sizes and three thicknesses give added flexibility to both design and construction problems.

Laboratory—Cornell Medical College
New York, N. Y.

Office—Southampton Grade School
Southampton, N. Y.



Kindergarten—Monroe School
Monroe, Connecticut

Library—Southampton Grade School
Southampton, N. Y.

Lobby—Riverhead High School
Riverhead, N. Y.

Corridor—St. Mary College & Academy
Monroe, Michigan

Classroom—Riverhead High School
Riverhead, N. Y.

Cafeteria—Harvard University
Cambridge, Massachusetts

PARTIAL LIST OF TILE-TEX SCHOOL INSTALLATIONS

Southampton Grade School, Southampton, Long Island (35,000 ft.)
Wm. LaFon, Architect, Southampton, Long Island
Las Vegas High School, Las Vegas, Nevada (38,000 ft.)
Geo. A. Ferris & Son, Architects, Reno, Nevada
St. Mary College and Academy, Monroe, Michigan (300,000 ft.)
D. A. Bohlen & Son, Architects, Indianapolis, Indiana
Northwestern University, Evanston, Illinois (40,000 ft.)
Belchertown State School, Belchertown, Massachusetts (6,200 ft.)
Kendall, Taylor & Company, Architects, Boston, Massachusetts
University of Mississippi, Oxford, Mississippi
Frank P. Gates Co., Architects, Jackson, Mississippi
Cornell Medical College, New York, N. Y. (110,000 ft.)
Coolidge, Shepley, Bulfinch & Abbott, Architects, Boston, Massachusetts
Berry Schools, Rome, Georgia (30,000 ft.)
University of Wisconsin, Madison, Wisconsin
Arthur Peabody, Architect, Madison, Wisconsin
Clifford B. Connelly School, Pittsburgh, Pennsylvania (50,000 ft.)
Edward B. Lee, Architect, Pittsburgh, Pennsylvania
Louisiana State University, New Orleans, Louisiana (43,000 ft.)
Weis, Dreyfous & Seiferth, Architects, New Orleans, Louisiana
Riverhead High School, Riverhead, Long Island (52,000 ft.)
Wm. LaFon, Architect, Southampton, Long Island
Terrell School, Fort Worth, Texas (22,000 ft.)
Phillips Exeter Academy, Exeter, New Hampshire (20,500 ft.)
Cram & Ferguson, Architects, Boston, Massachusetts
Junior High School, Sidney, Ohio (13,090 sq. ft.)
Loudenbach, Greytag & Loudenbach, Architects, Sidney, Ohio
Matteson High School, Matteson, Illinois (3,000 ft.)
Wainwright & Vaughn, Architects, Hammond, Indiana
Washington State Normal School, Ellensburg, Washington
J. W. Maloney, Architect, Yakima, Washington
New York University, New York, N. Y.
Augustus N. Allen, Architect, New York, N. Y.
Junior High School, Benton Harbor, Michigan (15,200 ft.)
Warren Holmes Company, Architects, Lansing, Michigan
Grade School, Old Lyme, Connecticut (15,000 ft.)
Ernest Sibley, Architect, Litchfield, Connecticut
University of Idaho, Southern Branch, Pocatello, Idaho (20,500 ft.)
Wyandotte County High School, Bethel, Kansas (11,800 ft.)
Peterson & Almon, Architects, Kansas City, Missouri
University of Alabama, Union Building, Tuscaloosa, Alabama (35,000 ft.)
Miller & Martin, Architects, Birmingham, Alabama
Washington Irving School, New York, N. Y. (32,000 ft.)
Board of Education Architect
University of Florida, Gainesville, Florida
Rudolph Weaver, Architect, Gainesville, Florida
Swanton School, Swanton, Ohio
Langdon, Hohly & Gram, Architects, Toledo, Ohio
Ethel Walker School for Girls, Simsbury, Connecticut (45,000 ft.)
St. Vincent DePaul School, Mt. Vernon, Ohio (14,800 ft.)
Glass & Ramsey, Architects, Columbus, Ohio
Calvin College, Grand Rapids, Michigan (10,800 ft.)
Robinson & Campeau, Architects, Grand Rapids, Michigan
Georgetown University Dormitory, Georgetown, D. C. (61,600 ft.)
Emil G. Perrot, Architect, Philadelphia, Pennsylvania
Concordia College, St. Paul, Minnesota (9,850 ft.)
Long & Thorshov, Architects, Minneapolis, Minnesota
Kent State Normal School, Kent, Ohio (15,700 ft.)
T. Ralph Ridley, State Architect, Columbus, Ohio
Morton Grade School, Hastings, Nebraska (29,200 ft.)
M. L. Evans, Architect, Hastings, Nebraska
Harrison Avenue Grade School, Mamaroneck, N. Y. (22,500 ft.)
District School No. 69, Watseka, Illinois (3,000 ft.)
North Junior High School, Joplin, Missouri (12,400 ft.)
T. W. Williamson, Architect, Topeka, Kansas
Brookville School, Brookville, Indiana (12,400 ft.)
Henkel & Hansen, Architects, Connersville, Indiana
University of Tennessee, Memphis, Tennessee
Jones & Furbringer, Architects, Memphis, Tennessee
Bell Skinner Musical Building, Vassar College, Poughkeepsie, N. Y. (3,000 ft.)
Allen, Collens & Willis, Architects, Boston, Massachusetts
Danvers High School, Danvers, Massachusetts (23,500 ft.)
Chas. G. Loring, Architect, Boston, Massachusetts

TILE-TEX WALL TILE—A NEW, LOW-COST WALL TILING—IDEAL FOR CORRIDOR WAINSCOTING

COLORS

A wide range of color, from light pastel shades to rich dark hues, is available.

Practically any decorative scheme is possible. Send for "Decorative Walls by Tile-Tex" which includes complete color charts.

An attractive corridor wainscot of Tile-Tex Wall Tiling

SIZES

Fourteen sizes, from small to large, make possible wall treatments heretofore not attainable with other wall materials.

Sizes are 3x3, 3x6, 4x4, 4½x4½, 4x12, 6x6, 6x12, 6x18, 9x9, 9x18, 9x27, 12x12, 12x24, and 18x24.

Now it is possible for schools to wainscot their corridors with an economical, durable, and attractive tiling which can be applied over existing plaster walls in present buildings, or over smooth plaster backing in new construction.

Toilets, restrooms, and cafeterias are other areas where this new, unique wall surfacing can be used to advantage. It's easily and quickly erected—it can be had in almost any color scheme in both plain and mottled colors—and it's simple and inexpensive to clean.

The cost of Tile-Tex wall tiling applied is considerably less than conventional ceramic tile. If alteration or damage necessitates repairs, it is possible to do so quickly and inexpensively with Tile-Tex wall tiling without muss or fuss. Installation is made by skilled wall covering contractors located throughout the principal cities and towns of the country.

THE TILE-TEX COMPANY
CHICAGO HEIGHTS, ILL.

ARMSTRONG CORK COMPANY

1240 State Street, Lancaster, Pa.

REDUCE NOISE . . . CORRECT ACOUSTICS

. . . WITH SOUND-ABSORBING CEILINGS OF CORK

IMPROVED hearing conditions in schoolrooms mean fewer mistakes, better grades, and higher teaching efficiency. That's why so many modern schools are eliminating noise with attractive ceilings of Corkoustic.

This CORK material soaks up sound the way a blotter soaks up ink. It comes in decorative colors, pleasing texture, and has high light-reflecting and insulating qualities. In addition, it is sanitary, fire-resistant, and inexpensive to maintain. Get all the facts about Armstrong's Corkoustic. A free, illustrated booklet, "Tune Out Noise," tells the whole story.

ARMSTRONG'S ACOUSTICAL MATERIALS

CORKOUSTIC **TEMCOUSTIC**

BEAUTY, ECONOMY, and DURABILITY

. . . IN SCHOOL FLOORINGS

NO matter what type of floors your school needs — whether for classrooms, corridors, cafeterias, basements, workshops, or gymnasiums—you're sure to find it in the Armstrong Line. For Armstrong manufactures the only **complete** line of resilient floorings for schools — Armstrong's Linoleum, Asphalt Tile, Rubber Tile, Cork Tile, and Linotile (Oil-Bonded).

Every Armstrong Floor is attractive, durable, economical, and easy to keep clean. A wide range of designs and colors is available. Scuffing feet and scraping furniture can't mar the smooth surfaces of these floors because the colors and patterns run right through the full thickness of the material. Expensive refinishing is unnecessary. Write for free booklet.

Armstrong's
RESILIENT FLOORS

COLORFUL SOILPROOF WALLS

. . . AT HALF THE COST OF OTHER PERMANENT MATERIALS

IF you want colorful, sanitary, low-cost walls that won't be harmed by finger prints, stains, or ink spots, then you will want to know about washable Armstrong's Linowall—the wall covering with the characteristics of linoleum.

Linowall is available in popular colors and textures to blend with any schoolroom interior. It is flexible and easy to install over old or new walls. It won't crack, chip, or craze, and it never needs expensive refinishing. Yet, despite all these superior qualities, Armstrong's Linowall costs only half as much as other permanent wall materials. It will pay you to consider all the money-saving advantages of Linowall. Write for booklet.

Armstrong's
LINOWALL

CONGOLEUM-NAIRN INC.

General Office: Kearny, New Jersey

Nairn Linoleum . . Ideal from Kindergarten to Post Graduate School for Floors and Walls

The pictures on these two pages illustrate the many uses of linoleum floors and walls in modern school construction. A striking example of the desirability of Nairn Linoleum. The Board of Education of Red Hook, N. Y., demanded the most up-to-the-minute building possible with the funds at hand for the new Red Hook Central School. The result is a school that is attracting unusually favorable comment from architects everywhere. The finest and most modern equipment of the building trade industry was incorporated throughout the construction and appointment of the school. It was natural, therefore, that Nairn Linoleum was selected for service over practically every square foot of the interior.

Nairn Linoleum, with its perfectly smooth, sanitary surface, has long been recognized as the ideal school floor. It is quiet and resilient underfoot, and easy to keep spotlessly clean. Moreover, it is inexpensively installed and lasts for years under the most punishing foot-traffic, without costly refinishing.

For school **walls,** Nairn Wall Linoleum provides an attractive, washable, **permanent** finish that is fade-proof, crack-proof and water-proof.

An attractive, appropriate Nairn Veltone floor in the kindergarten of the Red Hook Central School. Note the use of Nairn Wall Linoleum to wainscot height, with one-piece cove base and border

Nairn Linoleum gives this staircase beauty and safety. Veltone, with Nairn Wall Linoleum on walls and rounded over stair bannisters

Medical offices in Red Hook Central School. Nairn Linoleum with one-piece cove base eliminates hiding places for dirt or germs

For durability on floors, safety on stairs, utility on walls, and for beauty and cleanliness throughout, this installation of Nairn Linoleum products in the Red Hook Central School presents a self-evident and long-lasting testimonial to the diversity and value of linoleum for schools.

The range of design and color combinations in Nairn Linoleum for interior decoration are virtually unlimited and adaptable to almost every area in school construction.

Nairn Linoleum Floors and Walls are superior to other types of interior covering because they are more durable, easier to keep clean, germ-killing, insulating, beautiful in their own right, and—**not more expensive.** Nairn Linoleum decidedly makes any school a more pleasant, more inspiring place in which to work and learn.

For catalogs, samples, and free assistance in your wall or floor problems, write our Contract Department at Kearny, N. J.

Unique and practical use of Nairn Wall Linoleum in a window seat in the Red Hook kindergarten

The *perfect* corridor floor—Nairn Veltone Linoleum, which muffles the sound of clattering footsteps, yet will stand up under the most punishing heavy-duty service

NAIRN
Trademark Registered
Linoleum Floors and Walls
CONGOLEUM-NAIRN INC.

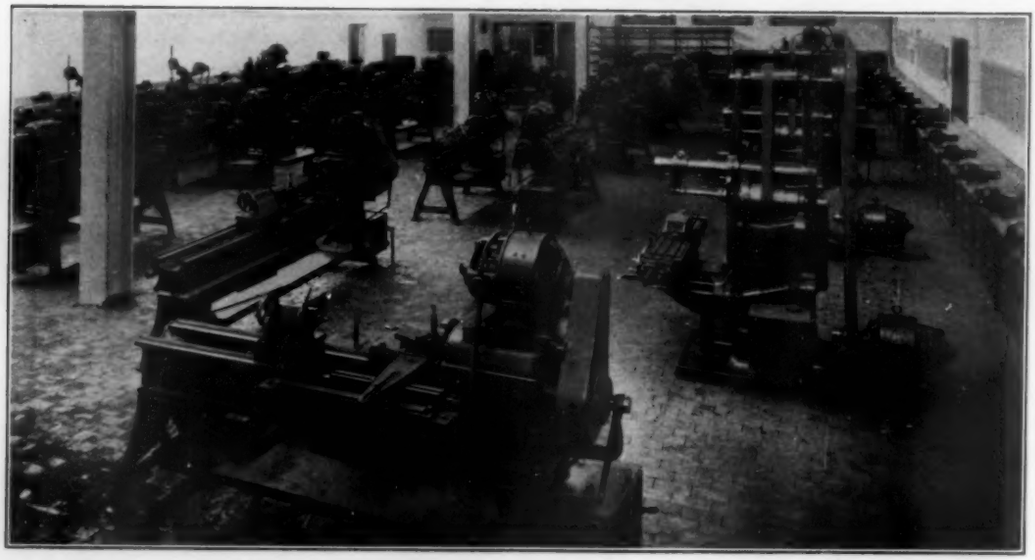
CONGOLEUM-NAIRN INC.

KEARNY, NEW JERSEY

THE JENNISON-WRIGHT COMPANY

Toledo, Ohio

BRANCHES IN ALL LARGE CITIES



Kreolite Separate Wood Block Floors serve in the school and educational institution no less than in the factory and work shop where today their use is so general as to reveal Kreolite as the national choice for heavy-duty service.

Especially is Kreolite specified for all departments where mechanical operations are carried on. Tools are not damaged when they are dropped, for the Kreolite floor is resilient. The floor is not damaged because wear and accident leave no appreciable impression upon the tough end grain surface of the specially treated selected wood blocks.

Among the scores of leading educational institutions now enjoying the economy and benefit of Kreolite Wood Block Floors are: East Tech. High School, Cleveland, Ohio; Jefferson High School, Los Angeles, Calif.; Lindbloom High School, Chicago, Ill.; University of Michigan, Ann Arbor, Mich.; Purdue University, Lafayette, Ind.; Technical High School, Indianapolis, Ind.; University of Illinois, Urbana, Ill.; University of Wisconsin, Madison, Wisc.; Yale University, New Haven, Conn.

Write for complete information

KREOLITE

WOOD BLOCK FLOORING

Kreolite Wood Block Floors Used in Over 200 Schools!

Kreolite Flexible Strip End Grain Wood Block Floor in the Gymnasium of the New York State Vocational Institution, West Coxsackie, New York

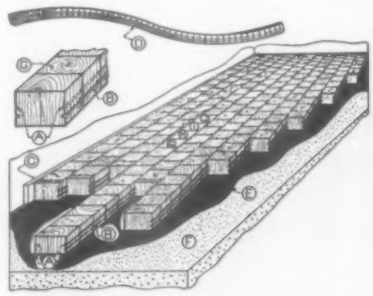
One of the many Kreolite gymnasium floors giving maximum of resilience, safety, appearance, wear, non-slipping, and all around satisfaction as to its ability to successfully withstand gymnasium play of all kinds.

The value of Kreolite Flexible Strip End Grain Wood Block Flooring is recognized instantly by the modern architect of schools and public buildings. They cannot become loose in the floor. The durability is practically limitless as the strips are laid with the tough end-grain of the individual blocks uppermost. The light natural color and beauty of the wood are retained, although the blocks are treated with a transparent, waterproof preservative.

Complete Information Sent on Request

(a)—Metal wire truss binding the individual blocks into a compact, solid monolithic-like end-grain plank or strip.

(b)—Metal spline binding the individual strips together.



(c)—Cork expansion joint laid flush with the surface of the floor.

(d)—Flexibility—can be laid over wood sub-floor, in mill type buildings.

(e)—Waterproof membrane between concrete and strips.

(f)—Smooth finish concrete foundation.

(g)—Surface sanded smooth.

(h)—Manufactured from properly dried yellow pine or fir.

(i)—Treated with a transparent, odorless, waterproofing preservative so that the natural light color of the wood is maintained. The surface of the floor may be waxed and highly polished if desired, presenting a most pleasing and beautiful design.

(j)—Laid with the tough end-grain up. End-grain blocks run full depth of strips, from top to bottom, each block being anchored to the base, in a bed of mastic.

Kreolite Wood Block Floors Used in Over 200 Schools!

THE LOXIT COMPANY

605 W. Washington Blvd., Chicago, Illinois

LOXIT FLOOR LAYING SYSTEM

(Patents Issued and Pending)

THE SYSTEM

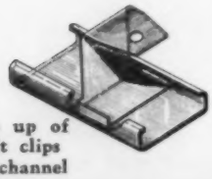
The Loxit system is a simple mechanical method for laying ordinary strip wood flooring without nails, wood sleepers, or adhesives. It consists of:

(a) A metal channel 1⅛″ wide by 5/16″ high with overlapping top edges, punched 4″ o.c. for fastening.

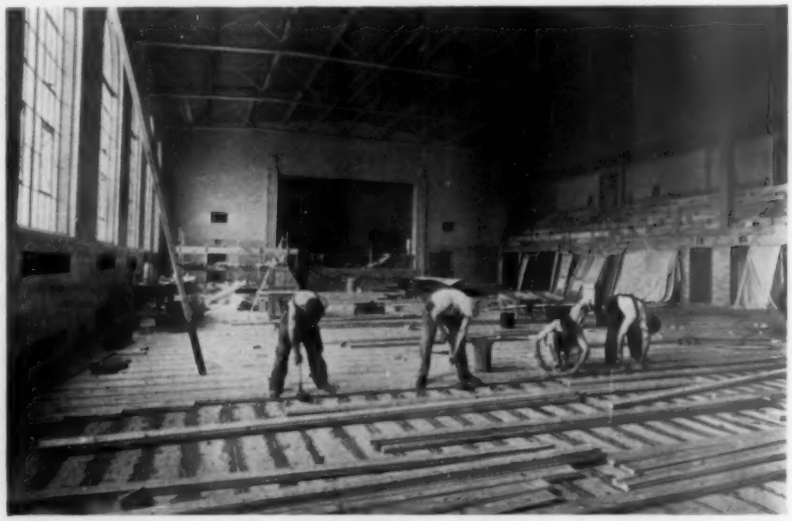
(b) Uniquely designed clips to be used in laying and locking the floor boards together and to the channels.

HOW TO USE THE SYSTEM

Loxit channels are spaced 12″ o.c. and lapped at the ends when floor area is more than 10 feet wide. They are secured to sub-floor using a suitable type of anchor, levelled, shimmed, and grouted. The wood flooring is laid in the same way that a nailed floor would be laid, but instead of using nails to fasten the flooring, a cleverly designed metal clip is used. The carpenter slips these clips into the channels immediately ahead of the last board and drives them into place by driving up the next board. The simple operation of driving up the board forces the clips to bite into and over the tongue of one board and embed themselves in the groove of the other, thus securely locking both boards together and to the channel. The tongues of the clips are slotted so that they automatically adjust themselves to the tongue and groove of the flooring.



Close up of Loxit clips and channel



Compound Loxit Gymnasium Floor Laid in 1934—High School at Lake Forest, Ill. Anderson & Ticknor, Architects; Wiebolde Construction Co., Contractors

Standard gymnasium floors are laid in the same way, eliminating the soft wood sub-floors. Note grouted Loxit channels

Laying 10,000 feet of finished flooring in one slab without expansion joints

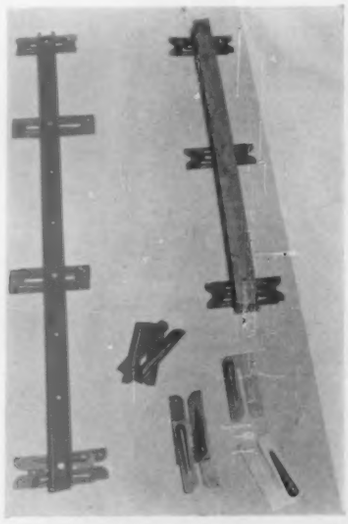
A FEW LOXIT FLOOR INSTALLATIONS

Valentine Boys' Club—Chicago, Ill.
Columbus School—South Norwalk, Conn.
U. S. Naval Training School—New London, Conn.
Boulder High School—Boulder, Colo.
Municipal Auditorium—Topeka Kan.,
Ahrens Trade School—Louisville, Ky.
Burroughs School—Madison, Wisc.
State Laboratories—Springfield, Ill.
Montgomery Ward Stores—Sioux City, Iowa
WGN Broadcasting Studios—Chicago, Ill.
Western Clock Company—Peru, Illinois (3 jobs)
Taylorville High School—Taylorville, Ill.
Community Building—Rockland, Me.

A FEW UNUSUAL ADVANTAGES

1. Total overall thickness of a Loxit laid floor including $13/16$" flooring is $1\frac{1}{8}$".
2. Floor can be laid without expansion joints as the Loxit system limits expansion.
3. Loxit floors can be laid tight, in fact the tighter the better, provided the usual precautions as to building conditions and acclimatization of the flooring have been taken, thereby securing a tight floor to start with.
4. Excessive shrinkage, repairs, and replacements can be easily and economically handled when floors are laid with the Loxit system because they can be taken up and re-laid without waste other than new clips.
5. Squeaks in wood floors are caused by vertical movement. When Loxit channels are properly shimmed and grouted and the flooring securely locked into place in accordance with instructions, vertical movement is eliminated and squeaking avoided.
6. Floors may be satisfactorily laid in basements and other areas where other types of wood flooring could not be used by following the simple precautions that are necessary under such conditions.
7. Loxit laid floors require only light sanding.
8. No special milling is required. Any flooring milled in accordance with the gauge adopted by the hardwood flooring manufacturers' associations can be used.
9. Loxit being a simple mechanical system of few parts, can be mastered within a few hours by any experienced floor layer. There is only one set of rules to follow and only one way of doing the work properly, the same as any other mechanical assembly. This eliminates guessing, simplifies floor laying, makes supervision easy, and assures uniformly good results.

Laying the Loxit channels. Note lapped joints Columbus School—South Norwalk, Conn. James J. Burly, Architect. A. J. Oest Inc., Flooring contractor



Showing Loxit all purpose metal shims used with Loxit channels or with wood furring strips

LITERATURE AND SPECIFICATIONS

A Loxit floor bulletin fully describing the system and its application including typical illustrations, drawings, and details, and specimen specifications for all types of jobs, residential, commercial or industrial including basement work, trucking aisles, and compound Loxit gymnasium floors, is available upon request.

TECHNICAL SERVICE

A staff thoroughly trained in building problems is at the disposal of architects for the study of unusual floor conditions. This service is offered without obligation. We solicit your inquiries.

OTHER LOXIT SYSTEMS

See pages 92, 93 for Loxit Acoustical tile suspension systems.

See pages 156, 157 for Loxit Blackboard System.

The proper way to lay a Loxit floor. Note clips set at an angle ahead of floor boards already in place. The carpenter's weight holds down the floor boards, so that the clips will seat properly

THE GOODYEAR TIRE & RUBBER COMPANY, INC.

Akron, Ohio · · Los Angeles, Calif.

Here's Why

WINGFOOT RUBBER FLOORING *and* WINGFOOT WALL RUBBER

—made by Goodyear

are first choice for both old and new buildings

Typical Wingfoot Rubber Flooring installation

WINGFOOT RUBBER FLOORING

IT can be made to harmonize with any decorative scheme because of its wide variety of design and color combinations.

Its handsome appearance and the brightness of its colors are easily maintained by occasional moppings with a damp cloth.

Its smooth, resilient surface is always comfortable and quiet underfoot.

It is ideal for classrooms and laboratories because its beauty is not marred by inks or even most acids, nor by alcohol, smoke or cigarette burns.

It is so durable that once installed it seldom, if ever, has to be replaced.

Comes in Two Forms

WINGFOOT SHEET RUBBER FLOORING—is available in continuous rolls, costs less and is especially suitable for large floor areas.

WINGFOOT RUBBER TILE FLOORING—is made in individual blocks of specified size, thickness, shape and colors. The main difference between the two types is that of form alone.

WINGFOOT WALL RUBBER

Wingfoot Wall Rubber provides walls of permanent beauty which is easily maintained.

For complete specifications, see Sweet's Architectural Catalog

THE GREATEST NAME IN RUBBER

GOODYEAR

WINGFOOT—T.M. The Goodyear Tire & Rubber Company

THOS. MOULDING FLOOR MFG. CO.

EXECUTIVE OFFICES
165 West Wacker Drive, Chicago, Ill.
DISTRICT SALES REPRESENTATIVES IN ALL PRINCIPAL CITIES

THOS. MOULDING FLOOR WITH RESILIENT *Moultile* FOR ENDURING BEAUTY

Flexible-Reinforced
MASTER ASPHALT TILE

Durability, the most important requirement for school floors, is an outstanding characteristic of Moultile Asphalt Tile. Millions of scuffing, scraping feet will cause no perceptible wear . . . will not affect color and texture which are uniform throughout. Moultile, therefore, requires no expensive periodic refinishing.

Moultile is quiet underfoot and has a pleasant resilience and elasticity. Available in more than 60 plain and marbleized colors and twelve sizes, Moultile can be installed in a practically unlimited variety of patterns. Colors are clear and do not fade.

Suitable for All Areas—Moultile is ideal for classrooms, corridors, and lobbies. In gymnasiums it yields a secure footing which does not tire contestants or cause floor burns and may quickly be waxed for dancing. There are special types of Moultile, "Greaseproof" for school kitchens, cafeterias, domestic science rooms, etc., and Moultile "Acid-resistant" for laboratories, toilets, etc.

Applicable to All Types of Sub-floor—Moultile may be applied over any smooth and firm sub-floor. Where subfloors are uneven or springy, Thos. Moulding has developed special materials for smoothing and strengthening preparatory to installing the finished Moultile floor. (See "Plastic Floors Division" at foot of right-hand column.)

Ideal for Basement Floors—Moultile and the asphalt cement in which it is laid are impervious to the alkali and dampness always present in cement resting on the ground, which destroy other types of flooring. Moultile bonds permanently, does not buckle or loosen and will not rot or decompose. It solves the problem of flooring over cement resting on the ground.

Installation—Thos. Moulding Floor Co. and other approved flooring contractors contract to install floors anywhere in the United States and nearby countries. Write for samples and complete technical information on Moultile and the company's other products, listed below.

University of Notre Dame, Notre Dame, Ind.
200,000 ft. Moultile in six different buildings

Above **— Gymnasium, St. Frances de Sales School, Minneapolis, Minn. Game lines inlaid with Moultile. Ellerbe & Co., Arch.**
Right **— Library, Catskill School, Catskill, N. Y. Ernest Sibley, Arch.**

THOS. MOULDING PRODUCTS

Tile Floors and Walls Division

Moultile Master Asphalt Tile
Moultile Prewaxed
Moultile Greaseproof
Moultile Acid-Resistant
Moultile Cove Bases
Moultile Straight Bases
Moultile Walls
Moultile Stair Treads (Moultread)
Moultile Safety Tiles and Treads

Plastic Floors Division

Asphalcrete (for smoothing rough cement)
Underlayment (for smoothing and reinforcing wood subfloors)
TMB Master Mastic Flooring
Moulstone Magnesia Composition Flooring

Maintenance Materials Division

Permagloss Self-polishing Wax — Sweepolene Sweeping Compound — Kleenolene Non-caustic Cleaner

Science Bldg., Texas State College for Women, Denton, Tex. 20,000 ft. Moultile "Acid-Resistant". Shirley Simons, Architect, Preston M. Geren, Consulting Architect

SERVICISED PRODUCTS CORPORATION

Manufacturers and Distributors

MAIN FACTORY — Chicago 6051 West 65th St., Chicago, Ill. BRANCHES IN PRINCIPAL CITIES

WHEN you are considering materials for school construction, remember that Servicised Quality products are giving exceptional service in this field. Continuous development of better products has won for **"Servicised"** leadership in the application of plastic, elastic and waterproofing materials to better building.

SERVICISED PRODUCTS FOR SCHOOLS

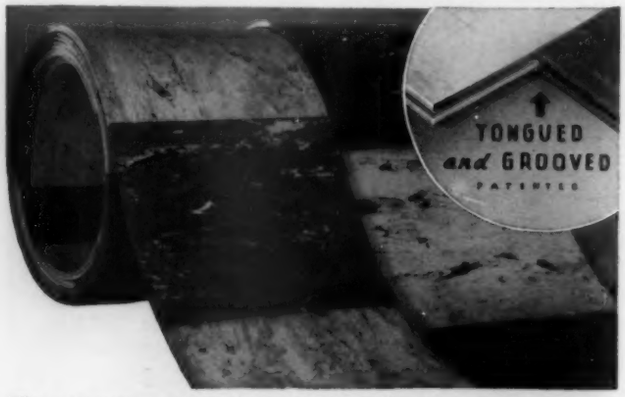
- Asphalt Expansion Joints
- Cork Expansion Joints
- Cork-Rubber Expansion Joints
- Sponge-Rubber Expansion Joints
- Asphalt Plank Flooring—Plain, Rock-Surfaced and Armored
- Asphalt Roof Decking
- Rubberlok Interlocking Rubber Flooring
- Cork-Rubber Tile
- Rubber Tile Flagging
- Safety Stair Treads
- Waterproofing Materials
- Asphalt Floor Tile

RUBBERLOK RUBBER FLOORING

RUBBERLOK Rubber Flooring is making architectural history. It has revolutionized all previous standards of laying and maintaining rubber floors. Rubberlok gives color and comfort and cuts cost of installation.

It makes a beautiful, resilient floor which cannot warp, curl, creep nor crack—and can be easily laid by any handy man at one-quarter the cost of installing single tile.

Rubberlok Rubber Flooring is made in 10 ft. strips which can be laid to make an impervious floor



The accurate tongue-and-groove joint shown in upper right corner ensures a perfect-fitting floor covering

The unique feature of Rubberlok is that it comes in 10-foot slabs, tongued and grooved on sides and ends for tight and interlocked matching. The pattern blocks are held together by a flexible stock which acts as an expansion joint between blocks. It cannot be laid wrong since it fits together so easily and accurately. Rubberlok is not merely a floor covering but a floor in itself.

A variety of non-fading colors and a wide range of patterns, both mottled and solid, are available. Slabs are furnished in 6″, 9″, and 12″ widths, 10 feet long and 3/16″ or ¼″ thick.

Rubberlok is recommended as economical and pleasing for any public room. We shall be glad to send you a special detailed folder and color chart on Rubberlok, the rubber flooring innovation.

RUBBER FLAGSTONE TILE

Brilliant in appearance, pleasing in design and color combinations, Servicised Rubber and Cork Rubber Flagstone Tile is rapidly coming into vogue for service floors which must be durable as well as attractive.

This flagging is usually laid in lobbies, reception rooms and entrance halls but it is equally adaptable to any floor space in the building. It has a distinctive and "livable" personality all its own and, in addition, provides a durable, easily-cleaned floor which is restful under-foot.

Rubber Flagstone Tile

SERVICISED RUBBER SAFETY TREAD

This is a recently developed Servicised product, far in advance of similar treads available at retail stores. It is a carefully moulded and cured product, made of finest pure para rubber. Easily installed, these treads give long and reliable service without cracking or peeling, and with high resistance to abrasion, oil, acids and moisture.

A real quality rubber stair tread that will stand the "gaff"

CORK-RUBBER TILE

Over a period of three years, Servicised engineers have checked up on Servicised Cork-Rubber Tile, both in actual service and in the laboratories. Their findings are conclusive: this new Servicised product meets all requirements for an ideal, silencing, resilient flooring material.

Its advantages: (1) High dirt resistance; (2) Flexible, conforming to minor variations of base without breakage; (3) Resists indentations and scratches; (4) Impervious to air, water and acids; (5) Light, yet very strong; (6) Lasting Beauty.

Cork-Rubber Type Flagstone Tile

Servicised Cork-Rubber Tile is a great improvement over cork flooring with a resin binder. It will give better service and deserves consideration for vestibules, corridors, gymnasium floors, libraries, infirmaries, etc.

Detailed Bulletins on these specialized flooring products will be furnished promptly at your request.

Use SERVICISED materials for tile installation work. SERVICISED underlayment to cover wood floors unsuited to saturated felt. SERVICISED asphalt primer or binder for smoothing uneven and rough concrete.

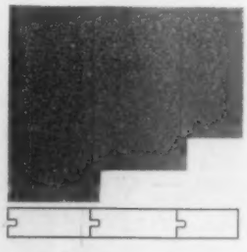
CORK RUBBER TONGUE AND GROOVE BOARD

Cork Rubber Tongue and Groove Board is a flooring board compounded of live rubber and ground cork. It is layed over inexpensive wood sub-floor, and produces an attractive, resilient, non-slippery, noiseless and easy tread flooring, assisting greatly in acoustical efficiency.

In color it has a slight random effect and can be had in dark or natural colors with standard thickness of ¾″ x 3⅜″ width; greater widths can also be furnished.

The installation of Cork Rubber Tongue and Groove Board is very simple. Over the ordinary sub-floor, is applied a 15-lb. felt paper. The Board is then applied, the same as Tongue and Grooved Lumber, plus a cement made for this purpose.

If a board flooring effect is desired, silence, soft tread under foot, semi-acoustical treatment, consider Rubber Cork Board as an outstanding item. The toughness and long life are also outstanding features. The artistic beauty and its soft natural and dark shade, blend in with any desired decorative color scheme.



WRIGHT RUBBER PRODUCTS CO.

1616 Layard Ave., Racine, Wis.

New York Office: 101 Park Ave.

Chicago Wholesale Office: 13113 Merchandise Mart

Manufacturers of WRIGHTEX and WRIGHTFLOR

Quality Rubber Tile Flooring

Library Installation of Wright Rubber Tile in Menasha High School, Menasha, Wisconsin

MODERN FLOORS OF *Lasting Beauty*

Wright Rubber Tile Floors today enjoy an enviable reputation among countless schools and universities for their rare beauty and thorough dependability—the reward of over two decades of specialized rubber tile research and manufacture.

Wright Rubber Tile has a tough, impervious, fire- and stain-resisting composition clear through. After years of heavy traffic its smooth surface remains unscathed. Remarkably easy to clean, maintenance cost is surprisingly low. Available in a wide range of colors and patterns to match any decorative scheme.

WRIGHTEX

Wrightex is a resilient rubber tile recommended for floors where quiet and comfort are desired qualities. While it has a "give" that absorbs the shock and impact of every step, it nonetheless has the toughness and density to resist the most severe traffic abuse. Properly installed, it remains permanently flat without creeping, shrinking, curling or warping. It's non-absorbent, a non-conductor and fire-resisting. **Costs no more than the higher grades of linoleum.**

WRIGHTFLOR
(Hard Tile)

Wrightflor is an annealed, homogeneous composition tile with rubber content, especially designed for extreme heavy-duty service. Molded and vulcanized under high temperature and hydraulic pressure, it has an exceedingly tough body that will not dent under heavy weight or summer heat. Is impervious to alkalies, grease, oil, and is easily maintained by damp mopping and dry buffing. Available in ten mottled colors and plain black.

Write for Literature Illustrated in Color

Wright Rubber Tile Installed in Men's Dormitory at University of Wisconsin

WRIGHT RUBBER TILE

THE LOXIT COMPANY

605 W. Washington Blvd., Chicago, Illinois

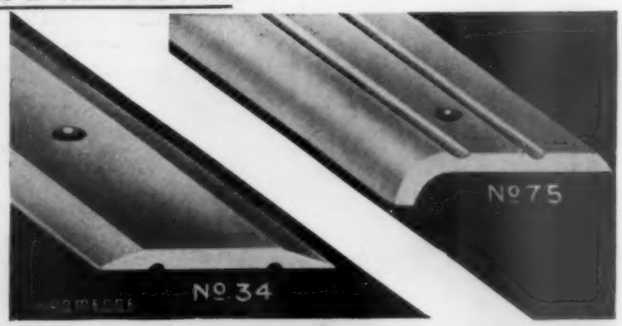
B & T FLOOR COMPANY

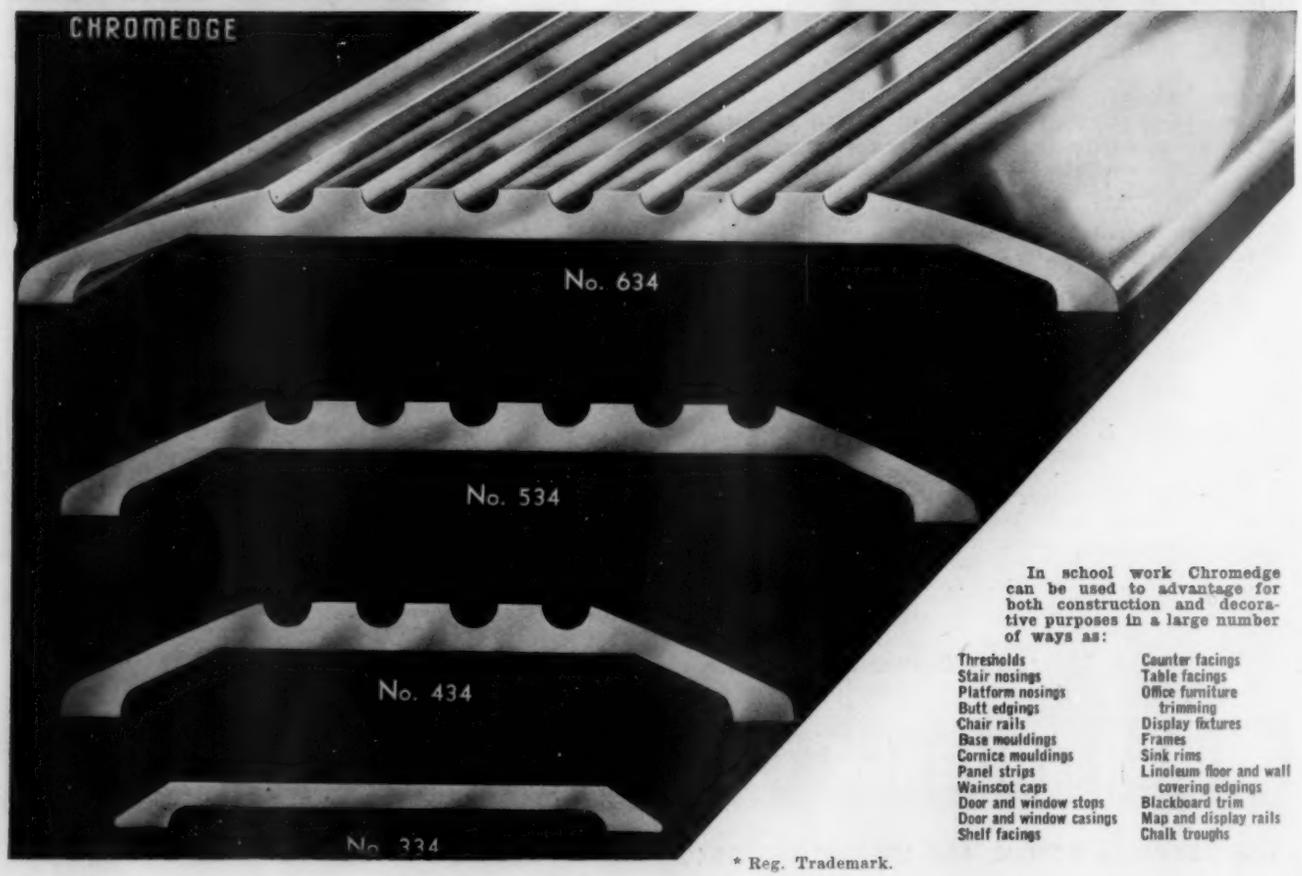
Columbus, Ohio

DISTRICT REPRESENTATIVES IN PRINCIPAL CITIES

AMONG the many new forms and materials that have become available to architects during the past few years in answer to the demand for modern designing, CHROMEDGE * is one of the most versatile.

CHROMEDGE is not merely a plated metal. It is manufactured from a specially prepared alloy that is the same all the way through. It has all the characteristics necessary for bending and fabricating into almost any conceivable design and in addition is strong, light in weight, and rust proof. With a little care, it will retain its finish permanently as there is no plating to wear off. It is available in dull as well as highly polished finishes.



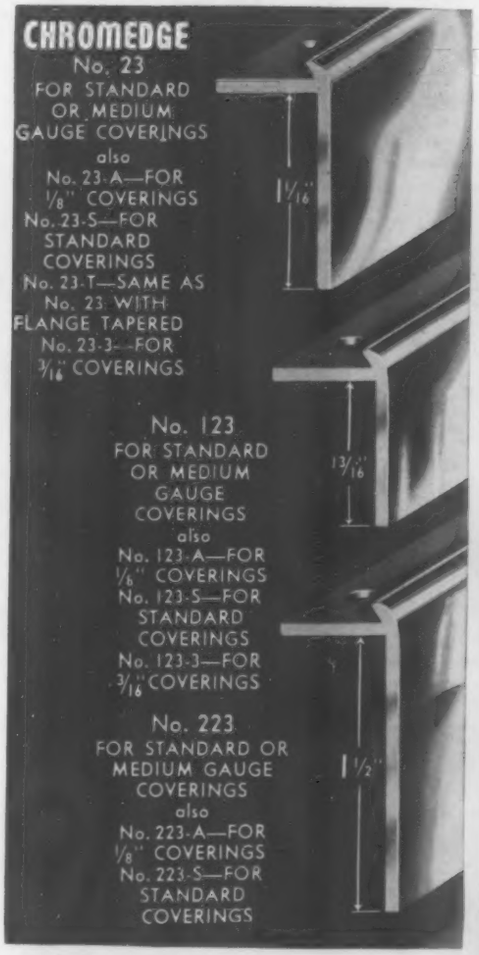


In school work Chromedge can be used to advantage for both construction and decorative purposes in a large number of ways as:

- Thresholds
- Stair nosings
- Platform nosings
- Butt edgings
- Chair rails
- Base mouldings
- Cornice mouldings
- Panel strips
- Wainscot caps
- Door and window stops
- Door and window casings
- Shelf facings
- Counter facings
- Table facings
- Office furniture trimming
- Display fixtures
- Frames
- Sink rims
- Linoleum floor and wall covering edgings
- Blackboard trim
- Map and display rails
- Chalk troughs

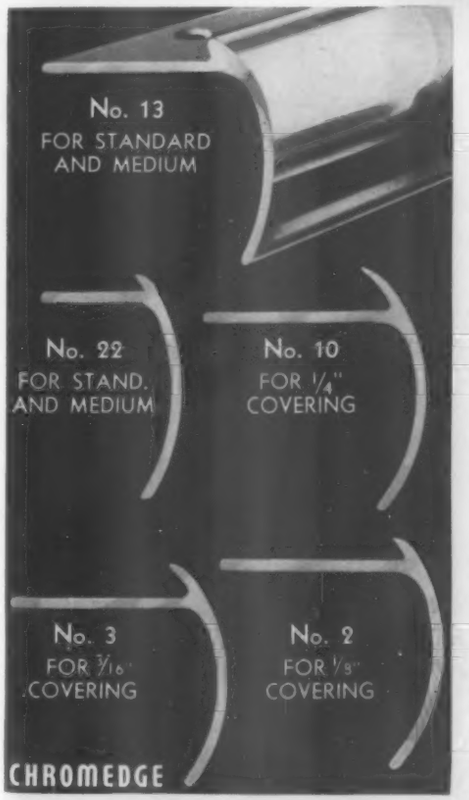
* Reg. Trademark.

Below—A Few Chromedge Mouldings



← Counter and Table Facing

Below—A Few Chromedge Stair Nosings



LITERATURE

There are more than 300 sections of Chromedge available to the designer and builder. Write for our large 40-page catalog. It shows all of the sections and their accessories as well as full size details and scale drawings suitable for tracing.

SPECIAL SECTIONS

We are prepared to make up special sections to carry out the architect's designs or to meet unusual construction problems at prices comparative in cost to similar standard items.

BENDING

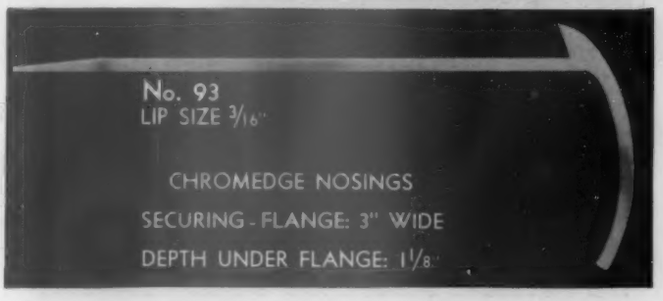
We can bend to any reasonable shape any Chromedge section, making it possible for the architect to use curves to carry out his designs or to eliminate sharp corners.

ESTIMATES

We are prepared to estimate and furnish Chromedge materials in accordance with plans and specifications.

TECHNICAL SERVICE

We solicit inquiries for technical service in connection with the study of unusual problems. Without obligation.



AMERICAN MASON SAFETY TREAD CO.

GENERAL OFFICE AND FACTORY

Lowell, Mass.

Description: A metal plate of Iron, Bronze or Aluminum impregnated with abrasive grains or flint-like particles projecting above the surface, presents a Non-Slip stair tread both durable and safe under all conditions.

Application: Stair treads and platforms for new or old construction, ramps, door and elevator saddles, floor plates, trench covers, and spiral stair treads.

Assistance: Solution of stair and slipping hazard problems gladly suggested.

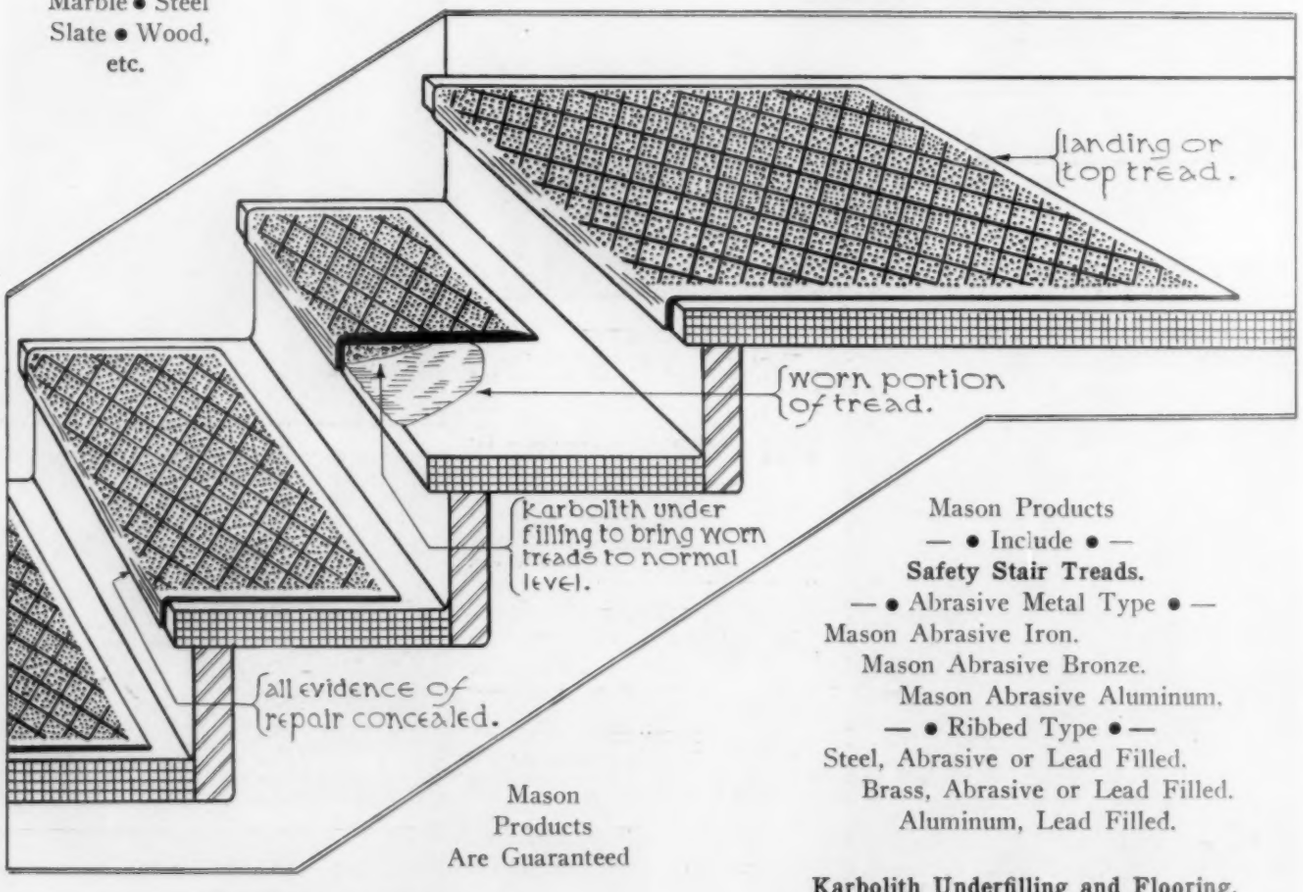
Advantages: Painful accidents on new or worn stairs can be prevented economically by application of Mason Abrasive Iron or Mason Ribbed Type Safety Treads.

Mason Safety Treads are used by Educational and Religious Institutions, in Public Terminals, and Industrial Plants, etc.

Mason Safety Treads are recommended by leading Architects, Safety Engineers and Insurance Companies.

Suitable for Marble • Steel Slate • Wood, etc.

Recommended Method of Applying Mason Abrasive Metal to Worn Stair Treads


landing or top tread.
worn portion of tread.
karbolith under filling to bring worn treads to normal level.
all evidence of repair concealed.

Mason Products Are Guaranteed

Mason Products
— • Include • —
Safety Stair Treads.
— • Abrasive Metal Type • —
Mason Abrasive Iron.
Mason Abrasive Bronze.
Mason Abrasive Aluminum.
— • Ribbed Type • —
Steel, Abrasive or Lead Filled.
Brass, Abrasive or Lead Filled.
Aluminum, Lead Filled.

Karbolith Underfilling and Flooring.
Mason Stair Nosings and Edgings.
Mason Safety Ladder Shoes.
Mason Extruded Thresholds.

CELEBRATING
50 YEARS OF SERVICE
TO MANKIND
PREVENTING STAIR ACCIDENTS
Catalogue and Samples
Supplied without obligation

· · · AGENTS IN PRINCIPAL CITIES · · ·

THE SAFE TREAD COMPANY

Manufacturers of

The Improved Abrasive Metal
—"SAFE TREAD"—

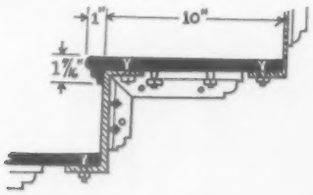
(Listed by the Underwriters Laboratories)

IRON—BRONZE—ALUMINUM

220 Broadway, New York City

AGENTS IN ALL PRINCIPAL CITIES

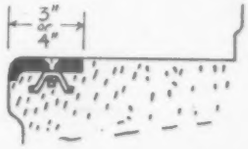
The necessity of providing slip-proof walkways for the safety of children and teachers has been established by the courts.



STYLE N5—FOR NEW CONSTRUCTION

Maintenance costs are likewise of utmost importance.

The use of "Safe Tread" Stairtreads—Door Sills, Platforms, Landings, etc., for new construction or repairs to existing walkways will insure the highest degree of **Nonslip** qualities and the greatest amount of **wearability.**

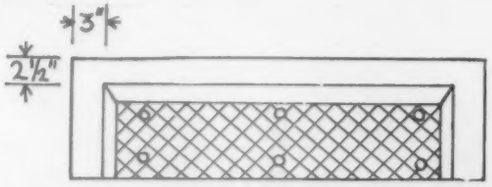


STYLE XL NOSINGS—FOR NEW CONCRETE

When Ordering or Requesting Quotation

Specify iron, bronze or aluminum Safetread—style nosing desired, width overall or back of nosing, length, surface design (see below), quantity of each size. If unusual shapes are required furnish detail sketch or template. If for repairs advise what type material is being covered.

Submit your walkway problems to us, we shall be glad to help you solve them.

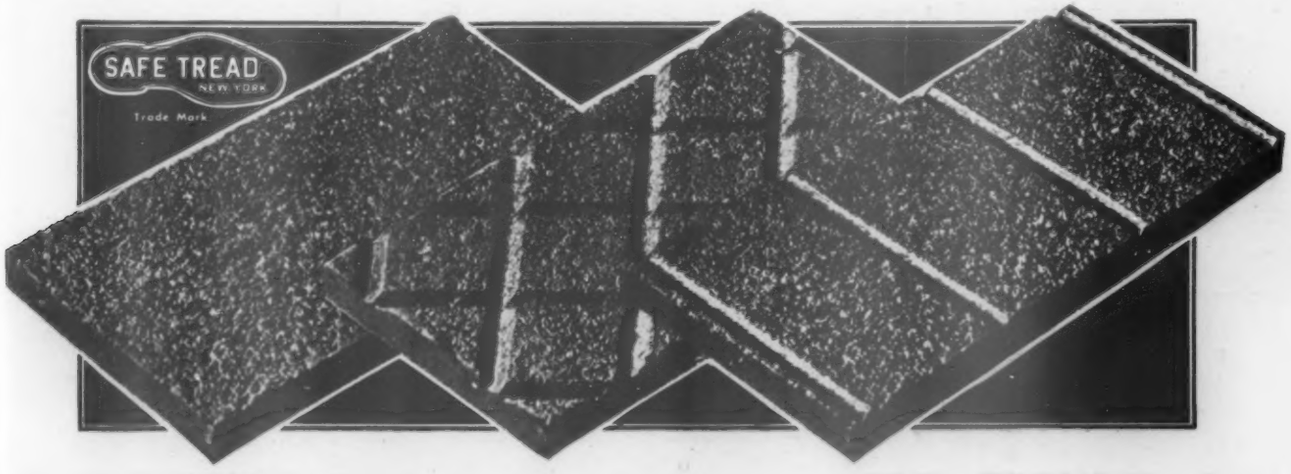


STYLE L—LIP ALONG FRONT EDGE, BEVELED BACKS AND ENDS

Recommended practice for repairs carry new tread to within 2½" of back edge of existing step and to within 3" of side of existing step.

STYLE L—FOR REPAIRS

	Concrete or Pan Filled	Wood, Marble or Stone
(A)	¼", ½", ¾", 1" or 1½", whichever required to cover worn area.	
(B)	Fill worn spots with cement before putting new treads in place. Secure with lead sleeves and wood screws.	



THE NATIONAL TERRAZZO and MOSAIC ASSOCIATION

1420 New York Ave., N. W., Washington, D. C.

Floor, wainscoting, and stairway of the Little Flower Girls' Catholic High School, Philadelphia, are made of Terrazzo. Let this moderate-in-first-cost, low-in-upkeep-cost flooring catch your finest designs—and hold them *permanently*.

No matter WHAT you want most in a floor, you'll get it with Terrazzo. Because Terrazzo gives you **everything** — remarkable permanence . . . unlimited possibilities for design and color . . . low initial cost . . . and minimum upkeep! What more could you ask from a floor?

What is Terrazzo? Terrazzo is made with marble chips in a wide range of colors, portland cement and water, plus mineral color pigment where desired. It is separated by dividing strips to guard against cracking and to facilitate carrying out of any design. It forms a dense, hard concrete, ideal for all floors that must stand the heavy, daily pounding and scraping of hurrying feet.

Where is it used? Terrazzo is usually mixed on the job. Thus, you may select your own pattern and be sure the finished job will be exactly as you planned it. You can use Terrazzo for entrances, corridors, classrooms, offices, laboratories, swimming pools, etc. Terrazzo may also be precast in special shapes and placed in units, for example, as wainscoting, stairs, and cornices.

To sum up, school floors must be durable and economical to install. But —now—they need not be drab: Now you can make them bright and attractive by using Terrazzo. Detailed information and complete specifications will be sent promptly upon request. There is no obligation, of course.

Free Advice on Using Terrazzo!

If you want more facts and authentic information on designing for and laying down Terrazzo floors, write to our Washington office, which deals especially with these problems. See Sweet's Catalog or write today.

5 Reasons Why You Will Want Terrazzo

1. **ECONOMY.** Initial cost plus no repairs . . . no replacement . . . minimum upkeep over a period of years for Terrazzo equals—usually is less than—initial cost plus repairs . . . and replacements . . . and higher upkeep for other types of floors.
2. **COMFORT.** Finished Terrazzo is easy to walk on. It is less slippery than any waxed surface. Furthermore Terrazzo can save you enough money to acousticate your ceiling, thus giving you a very low noise level.
3. **CLEANLINESS.** Terrazzo can be sealed so as to be practically non-absorbent. Its smooth, jointless surface cleans easily . . . can harbor no accumulation of macroscopic or microscopic germs. It is aseptic.
4. **COLOR AND DESIGN.** Terrazzo has warmth and beauty. You may specify any design you wish—pictorial or geometric—in virtually any combination of colors.
5. **DEPENDABLE INSTALLATION.** This Association's objective is to see that your Terrazzo installations turn out exactly as you want them. Write us today for complete information on the above points or see our advertisement in Sweet's Catalog for basic technical data.

Terrazzo in halls of Niles Center High School, Niles Center, Ill. Floors, steps and wainscoting are of long-lasting Terrazzo.

TERRAZZO...

for floors that stay rich and colorful!

Intricate design turns out perfectly! This is the Terrazzo flooring in corridors of the Sheboygan High School, Sheboygan, Wisconsin.

This distinctive floor will long grace the lobby of Boston University's Administration Building. Note the fine detail of the clean-cut design.

JOHNS-MANVILLE

22 East 40th Street, New York, N. Y.

OFFICES IN ALL LARGE CITIES

J-M SOUND CONTROL FOR SCHOOLS AND UNIVERSITIES

STUDENTS in many of our schools and universities today are 40% deaf—due to the bedlam of noise surrounding them and the poor acoustics of most classrooms and auditoriums. This is one of the most serious problems today confronting educational authorities.

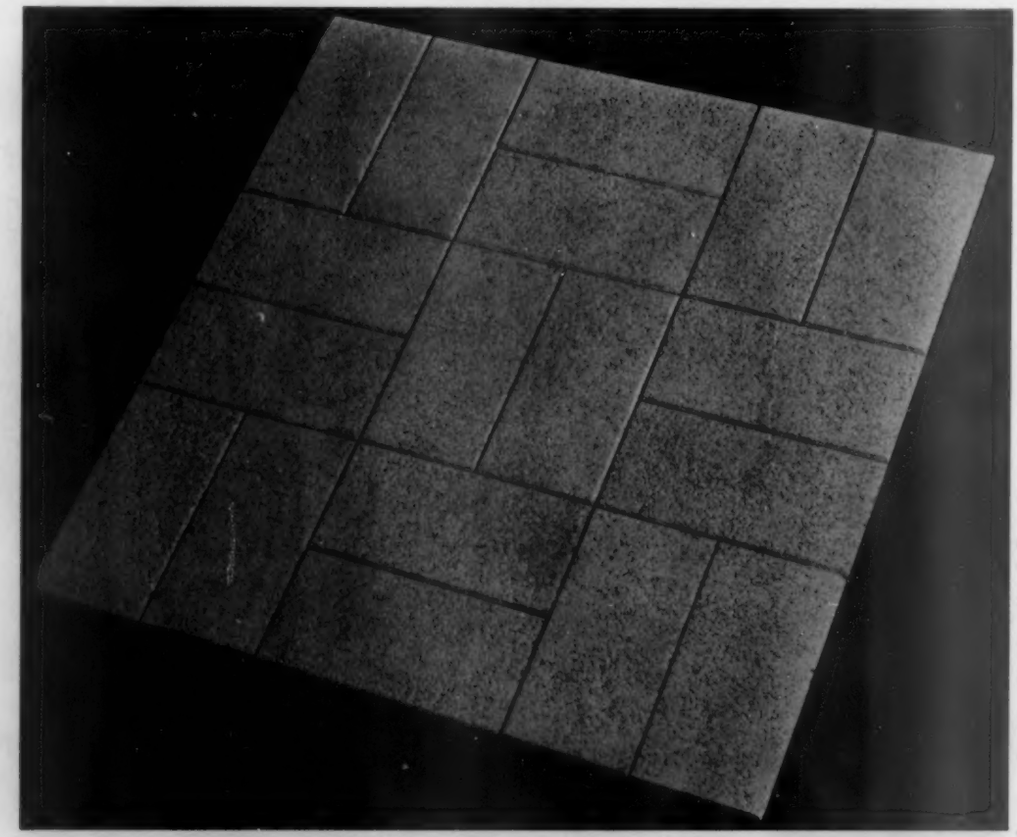
Yet, there is one sure way to solve the problem once and for all. Johns-Manville, pioneer in the field of sound control, offers time tried and proved materials and methods to banish this efficiency-lowering, nerve-racking evil quickly and economically. Even the noisiest room can be quieted and made a pleasant, efficient place in which to teach and study. J-M Sound-Absorbing materials reduce unwanted sound to harmlessness and, at the same time bring desirable sound —in the form of lectures and public addresses—directly to the ears of students without distortion or interference.

J-M SPONGECOUSTIC
"Soaks up Sound"

J-M Spongecoustic, a highly efficient noise-quieting material, is ideal for quieting schools and universities. Made of asbestos fibre, natural sponge and portland cement, it is economical, easily installed and provides a noise reduction coefficient of 65%. It is fire-resistant and virtually maintenance-free.

Natural Spongecoustic is a pleasing light gray in color and has an attractive porous surface texture. This material is also available in white, mottled white, light buff, medium buff, fawn (dark buff), French gray and apple green. The fissured surface of the painted material resembles stippling and lends a pleasing architectural effect to the area treated.

When desired, two or more colors can be combined in the same installation to produce a particularly deco-



This panel of J-M Spongecoustic, made with rectangular, 6″ x 12″ units, illustrates one of the many decorative patterns possible with this modern sound absorbing material. Economical, attractive, fire-resistant and highly sound-absorbent, Spongecoustic is the ideal material for quieting schools and universities

This gymnasium (*left*) and music room (*below*) are two of the many locations in the Pulaski Central School, Pulaski, N. Y., that have been quieted with J-M Spongecoustic. Here, as in many other schools, this modern noise-quieting material makes it easier to hear class instructors and prevents the transmission of sounds to nearby classrooms

rative treatment for auditoriums, corridors, offices, etc. Furthermore, Spongecoustic may easily be washed or re-painted without materially affecting its sound-absorbing efficiency. It is furnished in a variety of unit sizes and is quickly and easily installed.

ECONOMICAL

Most school authorities agree that an efficient sound-control treatment is an extremely important aid to both students and teachers alike. In many cases, however, there exists a mistaken idea about the cost of such a treatment. Actually, in spite of its many outstanding advantages, J-M Spongecoustic is an unusually economical, low-cost material. Specially developed for use in schools and universities, its low cost places it well within the reach of schools with only a limited budget.

J-M OFFERS A COMPLETE SERVICE

Spongecoustic, however, is only one of a large variety of Johns-Manville materials for noise quieting and the correction of faulty hearing conditions. Because school quieting and acoustical correction problems vary widely, some other product in J-M's complete line may solve a particular problem more effectively.

Sanacoustic, for example, has been widely used in schools and universities wherever noise conditions are particularly severe. Consisting of a perforated metal facing backed with a rock wool sound-absorbing pad, this material is so designed that it absorbs 85% of all noise that strikes it.

Transite Acoustical Units are recommended for use in swimming pools, kitchens, locker rooms and other locations where excessive moisture or severe physical abuse may be encountered. For preventing noises generated in woodworking shops, machine shops, ventilating equipment and similar noisy areas from reaching classrooms and study halls, Johns-Manville has developed an ingenious system of sound isolation that confines these sounds and vibration to their source.

ASK FOR FULL DETAILS

You will be interested in the Johns-Manville brochure, "Methods of Sound Control for Schools and Universities," AC-16A. It describes the characteristics and uses of all J-M Sound Control Materials, and tells how you may obtain the services of Johns-Manville Acoustical Engineers without obligation on your part. The booklet is free on request at any Johns-Manville office.

J-M ASPHALT TILE FLOORING

Johns-Manville Type A Asphalt Tile Flooring, composed of rectangular units of various sizes and colors, provides a resilient, quiet, decorative and long wearing floor that is ideal for use in the modern school or university. With the great variety of plain and marbleized colors and innumerable patterns possible, any desired effect is easily obtained—bright and cheerful, dark and rich, gay or unobtrusive—harmonizing perfectly with the decorative scheme of any school or university location.

Quiet and Sanitary

The unusual resiliency of J-M Asphalt Tile Flooring cushions footsteps and promotes quiet foot traffic. Furthermore, it is odorless, non-absorbent and will not originate dust. This, with its ease of cleaning, makes it particularly adapted to the high sanitary standards that must be maintained in all school and university locations.

Fire-resistant, Easily Maintained

J-M Asphalt Tile Flooring is fire-retardant and has been officially approved for use in fireproof buildings in many large cities throughout the country. Furthermore, the toughness and durability of the material is such that, baring exceptional abuse, it requires no attention or expense for maintenance beyond ordinary cleaning. For very severe service, such as that encountered in school corridors, halls, lobbies, etc., the special J-M Heavy Duty Asphalt Tile Flooring is recommended.

Details on Request

J-M Asphalt Tile Flooring costs no more than other resilient floorings, and in many cases the price is considerably less. For complete details on both Type A and Heavy Duty Asphalt Tile, send for Brochure FL-20. Address Johns-Manville, 22 East 40th Street, New York, N. Y.

J-M Asphalt Tile Flooring is ideal for use in all school and university locations

J-M Built-up Roofs are permanent, weatherproof, fire-resistant

J-M BONDED BUILT-UP ROOFS

Fireproof — weatherproof — rot - proof—durable—those are the outstanding features of J-M Bonded Built-up Roofs. Built up of alternating layers of asphalt-saturated asbestos felt and roofing asphalt, they combine two of the most durable materials known to science — provide permanent protection and virtual freedom from maintenance on all types of school and university buildings.

Will Not Dry Out

Asbestos fibres differ from organic fibres in that they are solid, non-capillary. In J-M Roofing felts they form a solid stone blanket that prevents the evaporation of the lighter oils in asphalt and preserves their waterproofing qualities indefinitely, despite the drying out action of the sun. Hundreds of J-M Built-up Asbestos Roofs, after more than twenty years of virtually maintenance-free protection against fire, sun and weather, are still in excellent condition.

J-M Roofinsul

J-M Roofinsul is a strong, rigid, light weight insulating material for use under J-M Built-up Roofs. It retards the passage of heat through the roof, making top floors more comfortable in summer and saving fuel in winter.

Complete Details on Request

Johns-Manville offers over thirty types of built-up roofs, both smooth and slag or gravel surface at a complete range of prices. For complete information on the entire subject of built-up roofs ask for the new brochure, "J-M Bonded Built-up Roofs." Address Johns-Manville, 22 East 40th Street, New York, N. Y.

THE CELOTEX CORPORATION

919 N. Michigan Avenue
Chicago, Illinois

CELOTEX ACOUSTICAL SERVICE

THE roll call of American schools that have successfully relied on Celotex noise quieting and acoustical correction in the past fifteen years is a long and impressive list of names. Whenever and wherever requested, The Celotex Corporation has gladly contributed its highly and completely informative catalog—Less Noise . . . Better Hearing—to every type of school and university, and when convenient, speakers from the Celotex Acoustical Engineering Staff have been supplied to lecture on Architectural Acoustics.

In every part of the United States and in Canada (Dominion Sound Equipments, Ltd.) there is established an exclusive distributor for Celotex Acoustical Products. These independently owned and operated concerns provide prompt, efficient, and dependable service in analyzing acoustical problems, recommending the proper material and application, and submitting estimates. The manufacturer is able by this means to assure users and itself of capable, conscientious responsibility for results.

PAINTABLE ACOUSTI-CELOTEX PERMANENT

TRADE MARK REGISTERED U. S. PATENT OFFICE

Acousti-Celotex sound absorbing tile is a highly efficient acoustical material whose most distinguishing characteristic is its perforations. These perforations (patented) are of definite diameter, depth and spacing. The C-Series tiles are made of cane fibre; the M-Series tiles are made of mineral fibre or aggregate. Noise-reduction coefficients of the Acousti-Celotex tiles range from .50 to .80.

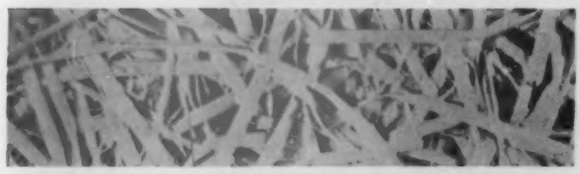
Pre-painted Acousti-Celotex may be washed and cleaned to renew light reflection values until painting is necessary. Note how holes are always kept clear of paint, thus assuring constant and permanent maintenance of original noise-deadening properties

ABSORBEX

Absorbex sound-absorbing tile is made of cement-coated wood fibres, compressed in matted form with a natural richly textured finished surface. It contains millions of minute air cells affording high insulation, structural strength, fire-resistance, and noise-absorbing value.

This acoustical tile is available in three textures (shown below), fine, medium and coarse; the fine texture product, Type A, is available in a variety of tile sizes.

Absorbex—Type A



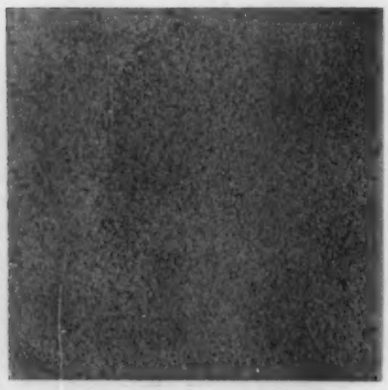
Absorbex—Type C

Absorbex—Type F

CALICEL AND CALISTONE

These products, stone-like in character and texture, are in fact made of highly expanded stone aggregates, to which suitable mineral binders are added. The unique appeal in these materials is the unusual combination of the beauty of stone interior finish and high acoustical value.

Above: **Rufus King High School Auditorium, Milwaukee, Wisconsin. Here Calistone has been applied to all walls and on ceiling in borders, surrounding the elaborate grilles. Architect: Guy E. Wiley, Milwaukee School Board**

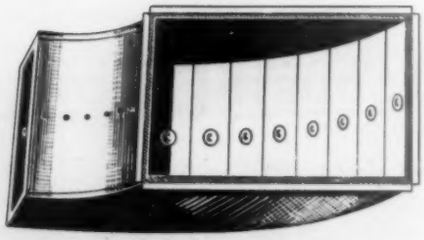


Here is a close-up of Calicel, in which is shown the beauty of its fine stone-like texture. This is standard type Calicel. Two other finishes are available, Italian and Tapestry

Standard Type Calicel

Q-T DUCTLINER

Q-T Ductliner is an acoustical material designed especially to absorb noise in air conditioning ducts. Prepared in rigid block form, made of mineral wool and a special binder, it will not smolder or support combustion.



Above: **An elbow duct, showing how Q-T Ductliner is mechanically fastened with bolts along all inside surfaces**

COST OF ACOUSTICAL TREATMENT IS LOW WHEN WISELY BOUGHT . . .

Though the cost of complete **sound-modernization** of your entire school building may exceed present available funds, a start toward noise reduction can be made by using Celotex Acoustical Products at small cost in your most troublesome areas. Such areas may include the band practice room, typing rooms, certain corridors or gymnasium. Why not let us survey your school and suggest proper acoustical treatment where it is most needed?

CELOTEX
REG U S PAT OFF

ROOF INSULATION

For top-floor comfort the year around and for a considerable reduction in fuel cost during cold months, Celotex Roof Insulation is the ideal material. Made of the famous genuine Celotex Cane Fibre, Celotex Roof Insulation is manufactured in rigid form, applicable to all types of roof decks, such as wood, concrete, precast tile, poured gypsum, metal, slate, etc. Its thermal conductivity meets requirements of United States Federal Specifications. Easily applied over existing roofs, it soon pays for itself in fuel savings, and increased comfort. It is an excellent base for built-up Roofing and is protected against Termites and Dry Rot by the exclusive Ferox Process (patented).

Applying Celotex Roof Insulation, RCA Building, New York City

CELOTEX
REG U S PAT OFF

BUILT-UP ROOFING

School authorities considering built-up roofing for new or existing schools are urged to give special consideration to the complete line of Celotex Built-up Roofings. Manufacture is subject to rigid control and these materials meet Federal and A. S. T. M. Specifications. Bonds are furnished when requested. When used with Celotex Roof Insulation, the finest type of roof is obtained, assuring long life, high insulation value and excellent weather protection.

TRAFFIC TOP

Celotex Traffic Top is a modern, attractive, resilient surface material for foot traffic that protects built-up roofs underneath. Made from genuine Celotex Cane Fibre Board impregnated with special asphalts, finished in various colors, and waxed, it provides a carpet-like surface and transforms wasteroof and other areas into playgrounds, tennis or badminton courts, and other recreational centers. Available in tile form, it is light in weight, easily applied to new or old roofs. Passes firebrand tests. Proofed against Termites and Dry Rot by the patented Ferox Process. Ask us about Traffic Top for your school.

Celotex Traffic Top on roof of Parochial School, Scarsdale, N. Y.

THE LOXIT* COMPANY

605 W. Washington Blvd., Chicago, Illinois

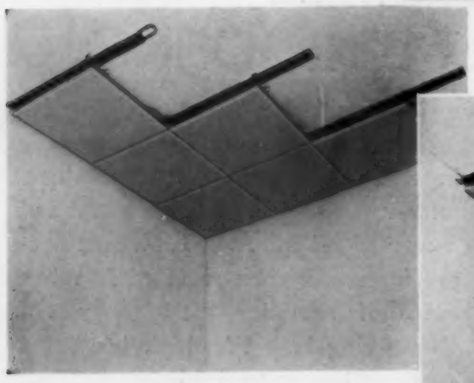


Fig. 1
Straight edge tiles laid with matched joints. Type A

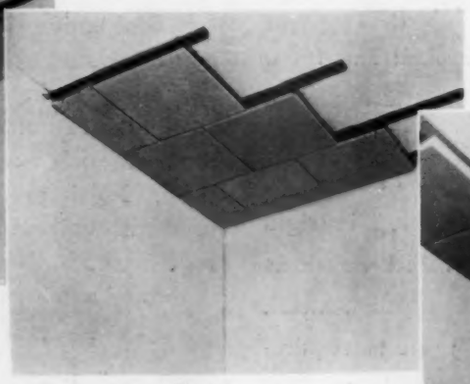


Fig. 2
Straight edge tiles laid with staggered joints. Type B

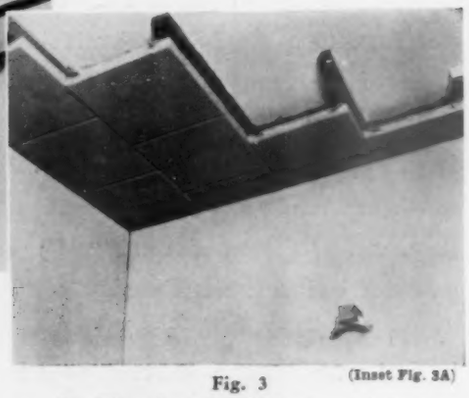


Fig. 3 (Inset Fig. 3A)
Straight edge tiles laid on wood furring strips with staggered joints using Loxit wood furring clips. Type C

Note on wall, double wing wood furring clip for matched joints. Type D(3A)

LOXIT ACOUSTICAL SUSPENSION SYSTEMS

(Patents Issued and Pending)

If you have an acoustical tile suspension problem you will find the solution in one or a combination of the six types of Loxit suspension methods available for use with straight edged or kerfed tiles and slabs, applied directly to ceilings, walls, beams, ducts, etc., or suspended.

Type A—Using Loxit channels and double wing clips for setting straight edged acoustical tiles and slabs with matched joints. See Fig. 1.

Type B—Using Loxit channels and single wing clips for setting straight edged acoustical tiles and slabs with staggered joints. See Fig. 2.

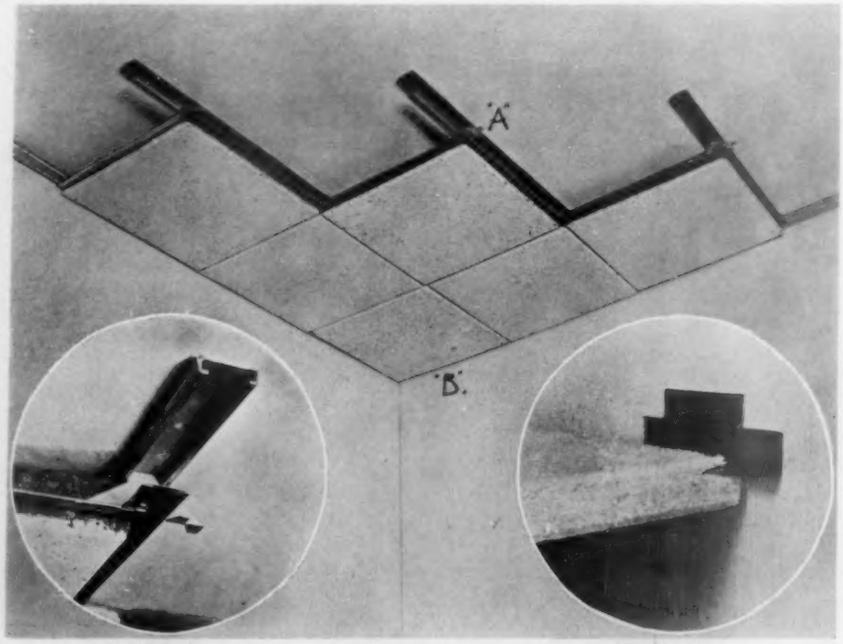
Type C—Using Loxit single wing wood furring clips for setting straight edged acoustical tiles and slabs with staggered joints. See Fig. 3.

Type D—Using Loxit double wing wood furring clips for setting straight edged acoustical tiles and slabs with matched joints, using wood furring. See Fig. 3A.

Type E—Using Loxit channels, hemmed runners and splines for setting kerfed acoustical tiles and slabs, the splines and runners serving as breathing stops as well as suspension members. This system is complete with wall angle runners and corner clips for the mechanical erection of the border and corner tiles. See Fig. 4.

Type F—A unique system composed of Loxit V strips, crosses, tees, and ells, specially designed to re-set acoustical tiles and slabs in existing installations that have become loose or for the setting of tiles and slabs directly to ceilings and walls by the use of a surface setting method which forms a wall or ceiling pattern and at the same time acts as a positive breathing stop. Particularly adaptable to plastered ceilings. This system is available in primed steel sections ready for painting and in stainless steel, also in other patterns in addition to the one shown.

In using this system acoustical tiles and slabs not originally mechanically suspended become permanently fixed in place providing against any further movement or breathing. See Fig. 5.



Detail at "A" Fig. 4 Detail at "B"

Kerfed tile suspension method. Entire ceiling locked together at all points. Type E

* Trade Mark.

Fig. 6

Acoustical installation using the Loxit system. Note method of erecting channel on structural furring. Liquid Carbonic Co., Chicago, Ill. Luse-Stevenson Co., Acoustical contractors.

LOXIT ACCESSORIES

(a) Loxit 3 piece clips used in the suspension of acoustical tiles and slabs where the bite must be on the sides rather than the corners. Particularly useful with long slabs laid parallel with the Loxit channels and where acoustical tiles and slabs are formed around beams, ventilating ducts, etc.

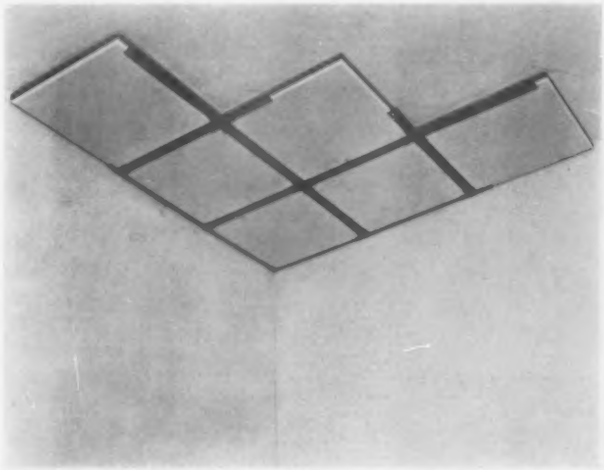


Fig. 5

This system is a "life saver" where acoustical tiles and slabs have become loose and must be re-set. Available for all sizes of materials; also in other designs. Type F

Also used for the end rows of square edged tiles in Types A and B.

(b) Loxit diamond points: These devices are useful as splines where tiles or slabs are of such a nature or size that they should be tied together one or more times between suspension points.

(c) Loxit auxiliary clips: To be used with Type B, slipping in above the tines of the single wing clips and over the Loxit channels and biting into the unsupported side of the adjacent tile to provide anchorage and avoid possible sagging.

(d) Loxit splice bars: Special designed spring steel splice bars used to join Loxit channels together making a straight positive splice that will not sag.

(e) Loxit metal interlocking shims. See Loxit floors, pages 74 and 75.

VERSATILITY OF THE LOXIT SYSTEM

In no other system can the architect or acoustical contractor find the solution to all of their acoustical problems when using tiles and slabs kerfed or straight edged with matched or staggered joints applied directly to wall surfaces and ceilings or suspended. We do not know of an acoustical tile and slab condition that cannot be solved with the Loxit system.

MATERIALS

All Loxit devices are fabricated from materials and gauges that have been adapted to meet building codes, government regulations and job conditions.

Loxit devices can be manufactured from other than our standard materials to meet unusual conditions or in accordance with specifications, upon request.

Fig. 7
Same job after completion, showing treatment of ducts.

ACOUSTICAL TILES AND SLABS

The Loxit Company is not directly or indirectly interested in any type, make, brand, or manufacture of acoustical tiles or slabs. Loxit applies only to the method of erecting acoustical materials and can be used with any and all materials on the market choosing the type of suspension that is adaptable to the material, taking into consideration whether it is kerfed or straight edged.

MECHANICAL SUSPENSION OFTEN REQUIRED

Almost all government specifications specify that acoustical tiles and slabs shall be mechanically suspended. More and more, architects designing private jobs are also requiring mechanical suspension because this is their guarantee that acoustical tiles and slabs will "stay put".

LOXIT CHANNELS

Loxit channels are of two sizes: CH-3, 1⅛" x 5/16" for all standard installations spanning up to 3' 6" using the lighter type of tile. CH-4, 1⅛" x ¾" to be used where spans are longer than 3' 6" or with heavier type tiles.

LITERATURE AND SPECIFICATIONS

A complete Loxit catalog describing in detail the various Loxit systems and accessories including full sized details, scale drawings and specimen specifications is available upon request.

TECHNICAL SERVICE

A staff thoroughly trained in the building business is at the disposal of architects and acoustical contractors for the study of unusual problems. This service is offered without obligation. Please consult us.

OTHER LOXIT SYSTEMS

See pages 74 and 75 for Loxit laid floors.
See pages 156 and 157 for Loxit Blackboard system.

A FEW LOXIT ACOUSTICAL INSTALLATIONS

Beverley Theatre—Chicago, Ill.
Daily Times—Chicago, Ill.
Jesse Spaulding School—Chicago, Ill.
Kanasha Valley Hospital—Charleston, W. Va.
Mergard's 20th Century Recreational Bldg., Cincinnati, Ohio
Our Lady of Peace Church—Chicago, Ill.
Sugar Grove Ave. School—Indianapolis, Ind.
Thornton Township High School—Calumet City, Ill.
Union League Club—Chicago, Ill.
University of Arkansas, Fayetteville, Ark.
War Dept. Air Corps Division—Wright Field, Dayton, Ohio
Indiana Village for Epileptics—New Castle, Indiana
Lane Technical High School—Chicago, Ill.
Western Penitentiary New Hospital Bldg., Pittsburgh, Pa.
Neuhoff Bros. Packing Co.—Dallas, Texas

WOOD CONVERSION COMPANY

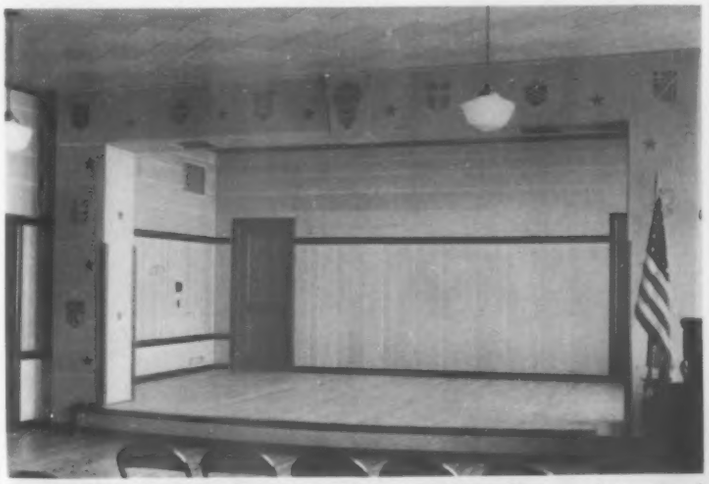
Manufacturers of

NU-WOOD Interior Finish . . . and BALSAM-WOOL Sealed Insulation

St. Paul, Minnesota

Nu-Wood Tile, Plank and Wainscot have been used to give new life and interest to this school band room

Nu-Wood Sta-Lite Tile on the ceiling assures better seeing in this school Library



Notice the interesting decorative effect obtained by the use of Nu-Wood in this school auditorium

NU-WOOD INTERIOR FINISH is a wall and ceiling covering uniquely adapted to school use. Here are the reasons why it provides outstanding advantages when used either in modernizing existing school buildings or in building new ones:

- HIGH LIGHT REFLECTION: *Nu-Wood Sta-Lite, available in tile, plank and board—the highest light reflection obtainable commercially in this type of product. Sta-Lite actually grows lighter with exposure.*

  Light Reflection, Sta-Lite 74%—Tan 40%—Variegated 38%.

- HIGH INSULATING EFFICIENCY: *Nu-Wood on walls and ceilings helps to cut down fuel consumption, keeps school rooms comfortably warm in winter, and cool in summer.*

  Thermal Conductivity—.324.

- ACOUSTICAL VALUE: *Nu-Wood absorbs sound, quiets noise, relaxes nerves of student and teacher, improves hearing.*

  Sound Absorption ½" Tan or Variegated Nu-Wood .30 at 512 cycles. Sta-Lite slightly less.

- **Soft Colors:** Nu-Wood colors are soft and subtle—never obtrusive. Nu-Wood is available in seven attractive shades, each color harmonizing with all the others.

- **Pleasing Texture:** Because of its unique texture, Nu-Wood banishes the bare, blank look from school walls and ceilings. Yet the texture of Nu-Wood does not call attention to itself.

- **Varied Pattern:** Available in the form of tile, plank, board and wainscot, Nu-Wood fits a variety of school uses in classrooms, auditoriums, offices, cafeterias, etc.

- **Easily Applied:** Nu-Wood can be applied directly over cracked plaster. In new construction, it is applied directly over framing members. Application is quick and easy.

- **Lasting:** Nu-Wood banishes the need for periodical school redecoration—an important economy feature. Sturdy, it keeps its fresh appearance through the years. It can easily be cleaned, or painted if desired.

- **Low in Cost:** With all its advantages the cost of Nu-Wood is surprisingly low.

THE AMERICAN BRASS COMPANY

General Offices

Waterbury, Connecticut

ANACONDA THROUGH WALL FLASHING

Why Through-Wall Flashing?

—Because modern skeleton frame construction requires spandrel waterproofing. Quoting from the Kidder-Parker "Architects' and Builders' Handbook":

"Because of the gradual reduction of thickness of exterior walls and the use of hollow-tile construction, wind-driven rain and moisture enter the structure through the face brick and mortar joints. The result is the formation of water pockets, which eventually make contact with ceiling and wall plaster."

Why ANACONDA Through-Wall Flashing?

Anaconda Through-Wall Flashing installed under copings and at the bases of parapet walls, also in side walls at frequent intervals (preferably at every floor and at all openings such as door and window-heads and sills), intercepts all rain water that seeps in and diverts it to the roof or outside face of the wall as desired, making the building walls completely rainproof.

School Architects and School Building Contractors

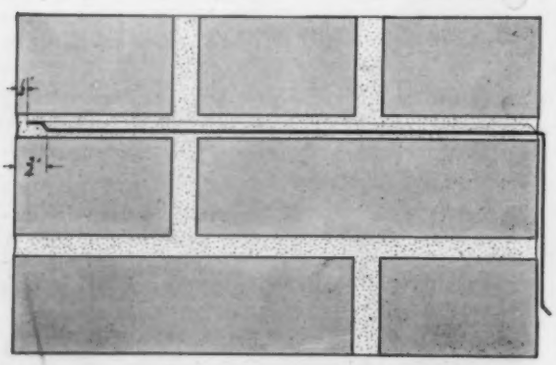
who have used Anaconda Through-Wall Flashing are enthusiastic about its many advantages:

1. The 7/32"-high zig-zag corrugations provide complete bond in the mortar in all lateral directions.
2. The integral dam throughout its length is the full height of the corrugations.
3. The dam and corrugations combine to give complete assurance of drainage in the desired direction. **This flashing will drain itself dry on a level bed,** reducing to a minimum the possibility of wet walls and heaving by frost.
4. **The flat selvage permits neat, sharp bends for counter-flashing or locking to adjacent sheet metal without distorting the flashing or inhibiting free drainage.**
5. Anaconda Through-Wall Flashing is easily locked endwise, even with the selvage preformed, merely by nesting one or two corrugations. This makes the joint watertight.
6. As shown in the illustration at lower left, the design of the dam is such, with its tongue near the top of the mortar joint, that this edge of the flashing can be placed within ¼-inch of the face of the wall and still provide sufficient bed for the pointing of the mortar joint so that it will not chip out. Thus, Anaconda Flashing protects more of the wet portion of the wall than is possible with types having turned-back dams.

Anaconda Through-Wall Flashing is Used in the Yorktown High School, White Plains, N. Y.

One-Piece Inside Corner Flashing.

One-Piece Inside and Outside Corner Flashings are now available for both 8" and 12" walls. They are so designed that the corrugations will interlock with those of adjoining straight flashings. Installation is simple: A corner is flashed by first assembling the three flashing pieces, then marking their exact position on the masonry. The pieces are then removed and a thin bed of mortar spread on the wall, after which the straight flashings are laid and imbedded in the mortar. The corner flashng is put on last, lapping the straight flashings by two corrugations.



Cross-Section of Through-Wall Flashing Detail

Anaconda Through-Wall Flashing is efficient, positive and durable, yet relatively inexpensive. It is readily adaptable to practically every masonry condition.

The principal feature of its design is the series of zig-zag ridges 7/32" high intersected at one end by a 7/32" longitudinal ridge which acts as a dam, causing any accumulation of water to flow to the opposite face of the wall.

The zig-zag ridges prevent lateral movement in any direction. The possibility of vertical movement may be disregarded, as a properly designed masonry wall has its mass and weight so proportioned in relation to wind and other forces that uplift does not occur under any normal condition except as a result of heaving by frost which, if of sufficient force to cause vertical movement of the wall or coping, would be sufficient to break the bond between masonry, mortar and flashing of any design. Actually, **Anaconda Through-Wall Flashing assures minimum risk of heaving by frost as it is so designed that it will drain itself dry on a level bed.**

Anaconda Flashing is available in a variety of types and sizes, made of 16-ounce Anaconda copper, either plain or lead-coated as required. All standard types for 8" and 12" walls are carried in stock in 5-foot and 8-foot lengths.

Because it can be bent and cut to fit on the job, Anaconda Through-Wall Flashing can be installed easily and quickly, with a minimum of delay to bricklayers and masons. Tight end joints can be made by overlapping one or two corrugations.

Detailed information is contained in Anaconda Publication C-28-s. Copies available upon request.

THE BARRETT COMPANY

Manufacturers of Roofing and Waterproofing Materials

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Roofing Materials—For Flat Surfaces: Barrett Specification Pitch and Felt Roofs, Black Diamond Pitch and Felt Roofs. Tarred and Asphalt Saturated Felts and Fabrics, Coal-Tar Pitches, Asphalt Cements, etc.

For Steep Surfaces: Barrett Steep Roof Pitch and Felt Roofs, S.I.S. Roofing, Anchor and Crystal Brand Asphalts. Barrett Asphalt Shingles and Roll Roofings. Roof Cements and Coatings.

Miscellaneous: Waterproofing for foundations, swimming pools, tunnels, floors, etc., special specifications submitted. Rock Wool Insulation, Insulating and Building Papers, for sheathing, lining, etc. Dampproofing and Protective Paints, Wood Preservatives. Tarvia-lithic for playground surfacing, roadways, paths and tennis courts. Roof Drain and Vent Connections.

For complete information about these and other products, write The Barrett Company, 40 Rector Street, New York City.

UNIVERSALLY RECOGNIZED AS THE GREATEST NAME IN ROOFING

Architects, engineers, school board members, university executives — just about everyone who has had experience in buying school roofs—know that the Barrett Specification Roof is tops in safety and service. That is why so many of the country's finest school and university buildings, as well as factories and office buildings, are covered by Barrett Specification Roofs.

There is no safer roof, because the gravel or slag surface is immune to fire hazard caused by flying sparks or embers. Barrett Specification Roofs take Fire Underwriters' Class A rating. The alternate layers of tar-saturated felt and coal-tar pitch make the roof completely and lastingly waterproof —for pitch is one roofing compound that is actually preserved by water. Barrett Specification Roofs are applied by Barrett Approved Roofers, selected with the utmost care on the basis of their experience, ability and business integrity. The roofs are bonded for periods up to 20 years against repair and maintenance expense and built to last.

ROOF INSPECTION FREE

For many years, The Barrett Company has offered building owners an unique service that has been the means of saving many thousands of dollars in upkeep expenses. On request, a Barrett Roof Inspector will make a careful survey of your roofs, flashings, copings, parapets, etc., and render a complete unbiased report. This service is free on buildings with roof areas of 5,000 square feet and up, located east of the Rockies.

The Macomber High School for Boys, Toledo, Ohio, is one of twenty-five school buildings in Toledo and vicinity Barrett-roofed by Fred Christen & Sons, Barrett Approved Roofer; Supervising Architect: Mr. Edwin Gee; General Contractor: Henry J. Spieker Company. All of Toledo.

THE PHILIP CAREY COMPANY

Manufacturers of

Roofing and Waterproofing Products, Heat Insulations

Lockland, Cincinnati, Ohio

The roof of a school building represents little more than 1% of the total construction cost yet on its durability and weather-resisting qualities depend the protection of the other 99%. The school roof should be designed and built to last the life of the building. Re-roofing is an expense that need not be incurred under ordinary conditions if the right roof is selected and properly constructed.

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Carey Roofs meet every requirement for modern school construction. For more than sixty years Carey Roofs have been specified for important public buildings throughout the United States, and their application to new school construction is increasing year by year because they have proved their durability and lasting protection against weather.

The quality of materials entering into Carey Built-Up Specifications are carefully checked by our engineering department and research laboratory, allowing a liberal factor of safety as to tensile strength, number of plies and thickness of plies, to assure adequate and permanent weatherproof protection.

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The Carey Roof Survey Plan has been in operation for several years and has been the means of cutting roofing upkeep expense to a minimum. Without obligation on your part, a Carey Inspector will make a careful survey of your roofs, flashings, parapets, etc., and give an honest and impartial report on their condition.

Carey Asfaltslate Shingles represent the standard of quality in composition shingles. They are built especially rugged and substantial to give extra years of trouble free service. They are proof against all ordinary fire risks and need no paint or other upkeep expense. Be sure to see the Carey Cork Insulated Shingle which is constructed to provide roof insulation that is automatically applied at the same time the roof is put on.

Careystone Asbestos Cement Shingles. Made of asbestos and cement, it provides a permanent roof possessing natural properties that enable it to resist the destructive influences of time, weather and fire.

Carey Heat Insulations. For low pressure steam or hot water heating systems, Careycel Pipe Covering has no equal. It combines high insulating efficiency with low cost. The Carey Heat Insulation Line is complete. A special insulation material to meet every service condition. Temperature ranges from zero to 2500° F.

Carey Waterproofing Materials. Carey waterproofing product for basement walls and swimming pools; Protective coatings to repair leaks and prolong the life of all types of roofs, protection paints for hot and cold metal surfaces.

For complete information on Carey Roofs and other products, write The Philip Carey Company, Lockland, Ohio.

The RUBEROID Co.

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21,400 sq. ft. Coal Tar Pitch and Tarred Felt RU-BER-OID Built-up Roofing

Architect: Myers & Johnson, Erie, Pa.

General Contractor: J. M. Benzinger, Inc., Jamestown, N. Y.

Roofer: G. Krack & Sons, Inc., Erie, Pa.

BUILT-UP ROOFS

RU-BER-OID Built-up Roofs, for flat surfaces or roofs with a slight pitch, have been widely used on school buildings. There are four popular types of Built-up Roofing: Asbestos felt and asphalt, coal tar pitch and tarred felt, asphalt felt and asphalt, and the combination roof consisting of asphalt felt, asphalt-saturated asbestos felt and roofing asphalt. Ruberoid makes all of these types so that you can choose according to climatic conditions, proximity to fire hazard, construction of the roof deck, the proper type to meet any condition.

Free Catalog

When desired, RU-BER-OID Built-up Roofs are bonded for 10, 15 or 20 years, depending upon the specifications. Bonded roofs are applied only by Approved Ruberoid Roofing Contractors. Complete catalog will be mailed upon request.

INSULATING MATERIALS

From the viewpoint of efficiency, Rock Wool is one of the finest insulating materials. Ruberoid offers you Rock Wool in three forms—loose or bulk for packing, granulated for pouring and in pre-formed bats for use between joists, rafters and studding. Complete data will be gladly forwarded upon request.

Free Catalog

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Eternit Gothics

For pitched roofs, where beauty is a factor, where a roof must be waterproof, fireproof, rotproof and time-defying—Eternit Asbestos-cement Shingles win favor with the architect. These shingles, Ruberoid-made, come in various finishes, designs and colors. One of the most popular is the Eternit Gothic textured like natural rock.

Tapered with a heavy butt, the Gothic Shingle lies perfectly, giving the effect of massiveness and yet without the burden of extra weight. Eternit Gothics are furnished in random widths and may be applied with staggered butts. The shingle is 12″ wide and 16″ long with approximately 5/16″ butts. Applied with 7″ x 12″ exposure. Weight approximately 525 lbs. per square.

The companion Asbestos-cement Shingle is Eternit Timbertex. This product reproduces the lovely texture of weather-aged cypress. It has all the qualities of the Gothic, but gives the effect of mellowed wood. Its size is 8″ x 16″, with approximately ¼″ thick butts. The exposure is 8″ x 7″ and the weight is 525 lbs. per square.

Eternit Timbertex

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85% Magnesia Pipe Covering

For Complete information write to School Engineering Department, The RUBEROID Co., 500 Fifth Avenue, New York, N. Y.

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Manufacturers of

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REG. T. M.

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Natural prerequisites of roofings for school buildings are the substance and quality of the roofing products specified, the reputation and integrity of the manufacturing organization—and the ability of the actual roofings to render unusual service in this specialized school field.

The experience of The Texas Company in the manufacture of roofings has proved repeatedly the ability of Texaco Asphalt Roofing Products to meet the most rigid requirements and specifications established for school buildings, whether in new construction or in re-roofing . . . long-lived endurance, protection, attractive appearance, fire-resistance and lasting economy.

Two simple facts are significant in understanding the high standards of quality and economy gained by using Texaco Roofings. **The Texas Company is one of the world's largest producers of asphalt . . . and asphalt is recognized as the most efficient water-proofing and weather-proofing agent known.**

These, plus the unlimited resources and facilities of an extensive manufacturing and distributing organization, constitute sound reasons for specifying Texaco Roofings on school buildings.

FOR COMPLETE DETAILS AND SAMPLES, COLORS AND SPECIFICATIONS SEE THE NEAREST TEXACO ROOFING DEALER OR WRITE TO THE NEAREST DISTRICT OFFICE OF THE TEXAS COMPANY.

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School authorities knowing the widespread distribution facilities of The Texas Company have learned that they can obtain local cooperation and immediate delivery through the many Texaco Roofing Dealers.

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Manufacturers of District Steam Heating Equipment and ADSCO Water Heaters

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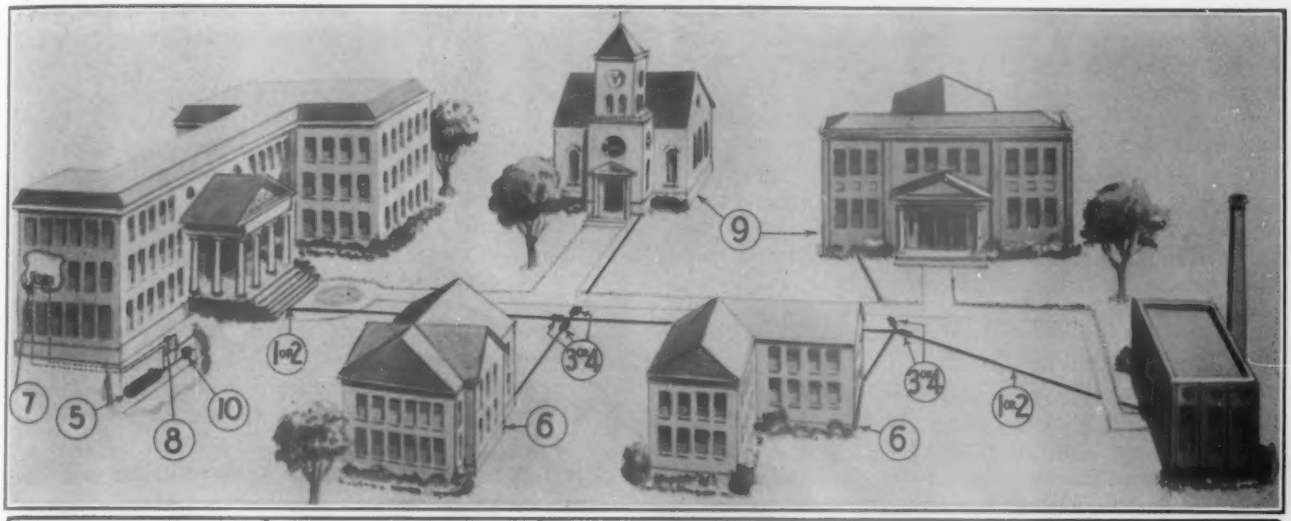

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ADSCO PRODUCTS Assure Dependable Heating Efficiency for Campus Steam Distribution Line Extensions or Replacements

Specified by Architects and Engineers

When planning new college buildings to be heated by an underground steam line extension from a central heating plant, many college architects and engineers take their specifications for the mechanical equipment from the ADSCO Catalog No. 35. It gives **complete** information from a **single book** on ADSCO Slip and Packless Types of Expansion Joints, ADSCO-Bannon Tile Conduit or Wood Casing for underground steam lines, Condensation Meters, Water Heaters, Pipe Supports, Steam Traps, etc. Send for your copy today.

Approved by Superintendents of Buildings

Superintendents of college buildings, responsible for the efficient operation of mechanical equipment costing thousands of dollars, approve ADSCO Products for steam distribution based on many years of favorable operating experience with ADSCO equipment. To them, an ADSCO specification means assured operating efficiency with a minimum of maintenance.

When new or replacement equipment is required they consult the ADSCO Catalog No. 35 **first** when requisitioning or purchasing steam distribution equipment.

Purchased by College Business Managers

College business managers and purchasing agents buy ADSCO Products with confidence for their campus steam distribution lines.

When new expansion joints, tile conduit, wood casing, condensation meters, water heaters, steam traps, radiator valves or other equipment is required, the **first** buying source is ADSCO to secure dependable products, reasonably priced with prompt delivery assured.

The ADSCO Catalog No. 35 illustrating and describing our equipment should be on every business manager's desk. If you do not have one, please request your copy promptly.

PARTIAL LIST OF USERS OF ADSCO PRODUCTS IN THE SCHOOL AND UNIVERSITY FIELD

Alfred University	Harvard University	Pennsylvania State College	University of Dayton	University of Texas
American University	Howard University	St. Bonaventure College	University of Florida	University of Toronto
Arkansas State College	Iowa State Teachers College	State College of Wash.	University of Maryland	University of W. Virginia
Barnard College	Juniata College	State Univ. of Iowa	University of Minnesota	University of Wisconsin
Bucknell University	Louisiana State University	Syracuse University	University of Montana	University of Wyoming
Carleton College	Michigan State College	Temple University	University of North Carolina	University of Utah
Columbia University	Middlebury College	Tufts College	University of Pittsburgh	Vassar College
Cornell University	Monmouth College	Union College	University of Rochester	Wellesley College
Dartmouth College	Pa. State Teachers College	University of Arizona	University of Tennessee	Williams College

EHRET MAGNESIA MANUFACTURING CO.

Thermal Insulations—Packings—Durant Insulated Pipe

Valley Forge, Pa.

EHRET DISTRIBUTORS OR APPROVED CONTRACTORS IN ALL PRINCIPAL CITIES

Ehret's 85% Magnesia is the standard material for insulating pipes and metal surfaces whose temperatures do not exceed 600° F. It is light, strong, highly efficient and lasts indefinitely. Available in a full range of sizes and thicknesses, in Pipe Covering and block forms, and in powdered form for use as a plastic cement.

Ehret's Enduro is the high-temperature companion to Ehret's 85% Magnesia. Made from precalcined diatomaceous earths, Ehret's Enduro is suitable for use on temperatures up to 2000° F., and is available in the same forms as 85% Magnesia. Multiple layer pipe coverings of the combination of these two materials are widely used.

Other Ehret Heat Insulations include materials such as air cell pipe coverings, Heat-Seal insulating wool blankets, asbestos blankets, spongefelt, Panel-Board, fill insulations, Durocel concrete, insulating and finishing cements.

Ehret's Refractory Cements include a full range of dry, plastic and castable materials for temperatures up to 3300° F.

Ehret's Heat-Seal Building Insulations are made of fine, light, strong mineral fibre that resists settling or disintegration. Made in granular form for blowing or pouring into enclosed spaces, in loose form for packing by hand, and in both unbacked and paper-backed batts of standard sizes.

Ehret Cold Insulations are made in a wide range of materials. Standard Hair Felt, Cork, Wool felt, Anti-sweat and Frost-proof coverings are some of the many forms of Ehret low temperature materials.

Ehret Packings are furnished in standard forms for practically every mechanical packing requirement. These Valley Forge packings are described in full in a special packing catalog.

For full details of the many Ehret products, see the Ehret Insulation Manual.

●

FOR DEPENDABLE, TROUBLE-FREE PROTECTION OF UNDERGROUND AND OUTDOOR PIPE-LINES SPECIFY EHRET'S . . .

DURANT INSULATED PIPE

This unique system of pipe-line protection consists of standard pipe that is insulated, sealed and protected **at our factory,** and shipped to the job ready for installation. The easy field-jointing method shown in the illustrations at the right can be followed by ordinary workmen, and the completely installed system can be practically forgotten, as far as maintenance or upkeep is concerned.

Ehret's Durant Insulated Pipe will not crack or leak, and moisture or water is permanently excluded by the time-defying layer of high-melting-point asphalt that encloses all parts of the system. No sub-drains, tile or concrete required and backfill can be made as soon as the pipe is installed. Trenches can be shallow without fear of damage by impact from trucks or other heavy vehicles.

Write for the special Ehret folder describing D. I. P. in full detail.

1 Pipe ends can be joined with threaded or welded fittings, or butt-welded as shown above.
2 The finished pipe joint is next covered with 85% Magnesia pipe insulation—snugly fitted in place.
3 The sheet metal pouring jacket is wired on over the joint—with the pouring slot located at the top.
4 Special Durant asphalt is melted and poured into the jacket. This quickly hardens into a perfect, permanent seal.

THE RIC-WIL COMPANY

Underground Conduit Systems for Heating and Power Pipes

Union Commerce Building, Cleveland, Ohio

New York, Chicago, San Francisco — AGENTS IN PRINCIPAL CITIES

REG. U. S. PAT. OFF.

RIC-WIL

PRODUCTS

Ric-wiL Interlocking Conduit and Base Drain Foundation, Tile and Cast Iron; Ric-wiL Insulated Pipe Units; "Dry-paC" Waterproof Asbestos Conduit Insulation.

PRODUCTS

Roller Pipe Supports; Alignment Guides; Manhole Covers; Asphalt Impregnated Filter Tape.

Ric-wiL Interlocking Conduit

Ric-wiL Conduit is first quality, standard weight, vitrified glazed tile of the bell and spigot type.

It is shipped on the job in full round sections and split into top and bottom halves as used. Thickness of tile is reinforced to double strength at top and bottom. When installed, bell and special Loc-liP side joints are sealed with portland cement. Loc-liP joint (see illustrations) is shaped so that cement locks top and bottom halves permanently together in all directions, giving conduit extraordinary rigidity and strength. Leakage is practically impossible. Top and bottom halves are interchangeable (foolproof) and numbered in pairs so that companion pieces may be kept together.

Sections are all in 2-ft. lengths, sizes from 4 to 27-in. inside diameter. Every sixth section of conduit has an opening in the bottom half through which a pipe support of the roller type projects to carry the steam, hot water or oil pipes, thus making the pipe supports independent of the conduit itself, a desirable feature for this class of work.

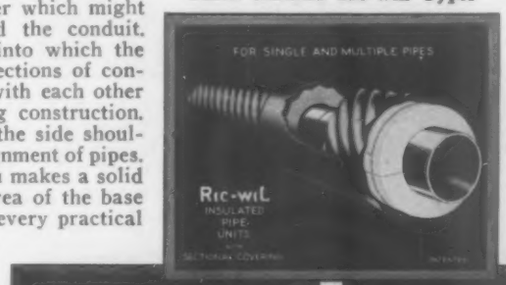
Ric-wiL Interlocking Base Drain Foundation

Ric-wiL Base Drain Foundation is first quality vitrified glazed tile, so designed that it is both a base for supporting and lining up the conduit and drain for carrying away water which might otherwise accumulate around the conduit. Top of base drain has slot into which the bell of conduit fits, making sections of conduit and base drain stagger with each other to form a strong interlocking construction. Pipe support saddles rest on the side shoulders, which insure perfect alignment of pipes. Wide flat bottom of base drain makes a solid foundation. Free drainage area of the base drain is large and ample for every practical condition. Made in three sizes to support properly all conduit sizes.

Cast Iron Ric-wiL Conduit

For extra heavy duty under railroads or where conduit is subject to very heavy loads, Ric-wiL is made of cast iron. Has Loc-liP Joint and "interlox" with tile Ric-wiL—made for all 5 types described in next column. A special heavy duty tile base drain or a cast iron base drain is provided for use with Ric-wiL Cast Iron Conduit.

Three Selected Ric-wiL Types



SYSTEMS TO MEET ALL CONDITIONS

Type F System—For steam heating, power pipes and superheated steam. A conduit that assures super-efficiency when insulated with Dry-paC (description below), or Ric-wiL No. 11 Filler, packed around pipes in closed construction.

Type SPC System—For steam heating, power pipes and superheated steam. Insulation is any standard make of sectional pipe covering, kind and thickness depending upon service to be rendered. Double drainage is provided in this type.

Type DA System—For hot water, oil transmission and condensation returns. Tile and insulation in one, the latter, a diatomaceous earth mixture of high insulating quality, moulded inside the tile and keyed in. This type insulates the pipes from surrounding ground but not from each other, making it specially adapted to carry oil and steam pipes together for oil transmission. Exceptionally easy to install.

Type DF System—For steam heating, power pipes and superheated steam. This is Type DA with the addition of Ric-wiL Asbestos Conduit Filler to be packed around pipes at a density specified by manufacturer. Filter is a good non-conductor which will not corrode the pipes nor shrink. Dry-paC furnished when specified.

Super-Strength Tile Conduit—To support any average traffic load, or for use in trenches of extra depth. Details on request.

Dry-paC Waterproof Conduit Insulation

A high-grade long fibre asbestos insulation, processed so that it is permanently water repellant. Of unusually high efficiency and great natural strength, it will not slump down away from pipes and is non-corrosive. Sample will be sent gladly for testing.

Insulated Pipe Units

These pre-sealed factory-built Units come in standard lengths, complete with steam pipe, insulation and all accessories. Armco Hel-Cor Conduit used has heavy asphalt coating and protective wrapping to resist all deterioration. Choice of insulation including sectional pipe covering.

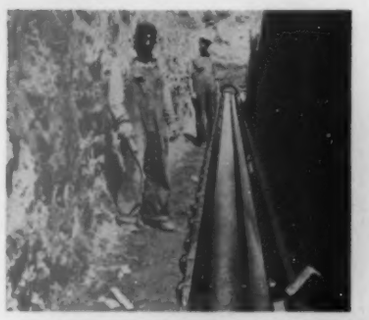
Engineering Service

Full co-operation with architects and engineers; complete service details and installation instructions; installation supervision where desired.

Catalogues, test reports, typical specifications, etc., promptly on request.

Skidmore College, Saratoga Springs, N. Y.

University of Kentucky, Lexington, Ky.



University of Washington, Seattle, Wash.

MILCOR STEEL COMPANY

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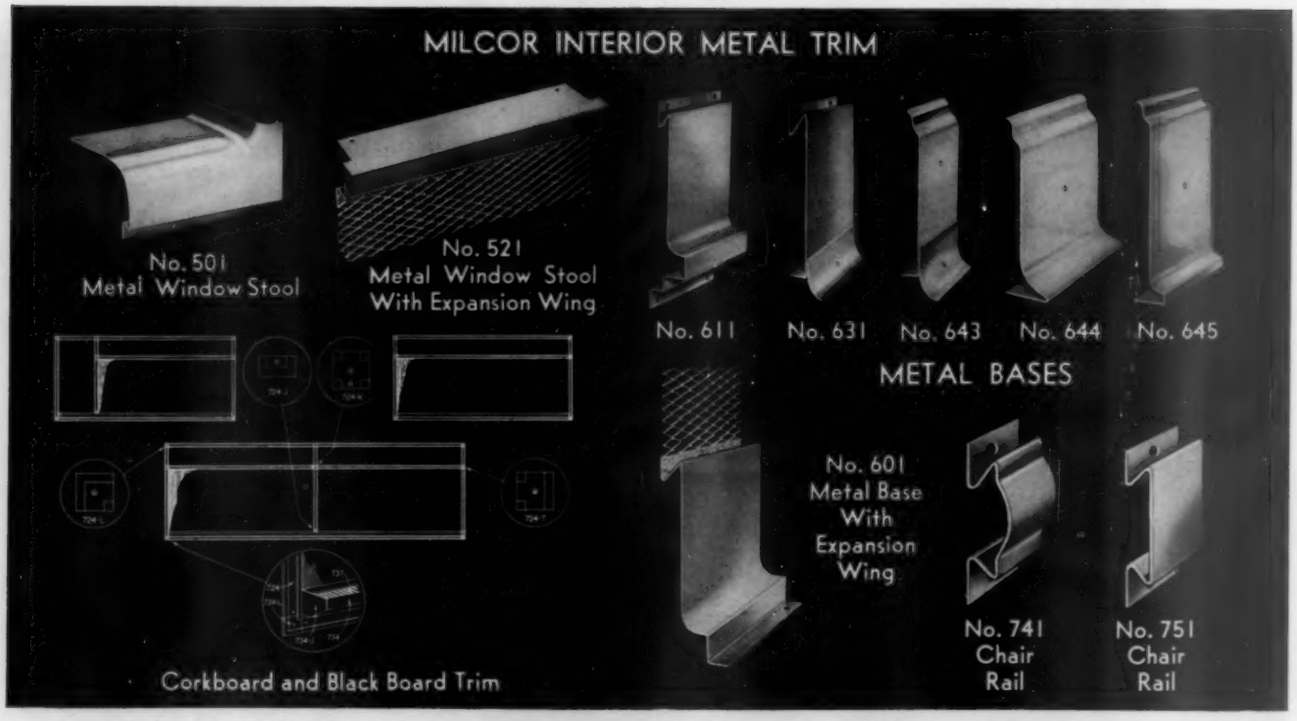


METAL TRIM OF UNSURPASSED BEAUTY AND DURABILITY

Milcor Metal Trim is the finest interior trim available for modern school construction. Permanence, fire-safety, and resistance to abuse are a few of the reasons why this line has been specified in representative school construction in all parts of the country. Its attractive appearance and exceptional sanitation make it especially adaptable to school use. Every desirable type of interior trim may be found in the complete Milcor line.

The Expansion Wing, which is an optional feature of many Milcor Metal Trim products, provides a permanent plaster bond, preventing checking and cracking of plaster at vulnerable points. And in schools, especially, it is desirable to preserve the original plastered surface.

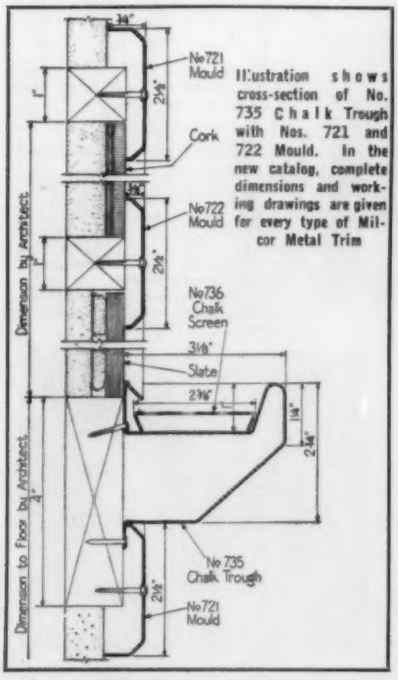
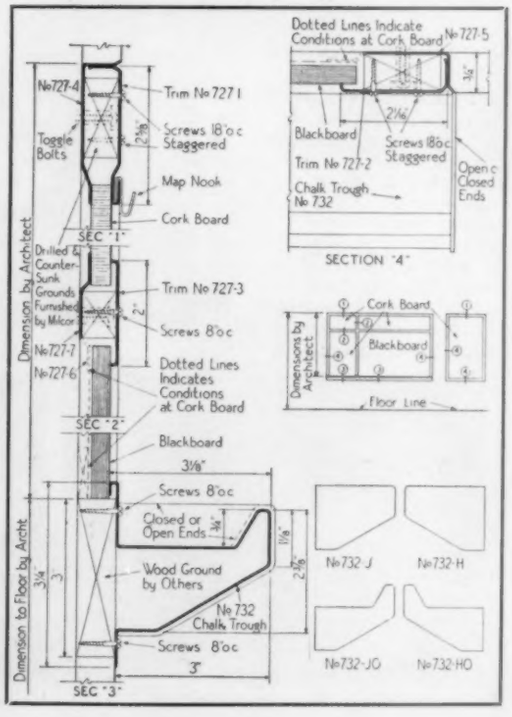


Illustration shows cross-section of No. 735 Chalk Trough with Nos. 721 and 722 Mould. In the new catalog, complete dimensions and working drawings are given for every type of Milcor Metal Trim

Illustration at right shows cross-section view of No. 727 Series Cork Board and Blackboard Trim

Write for the 100-C Milcor Metal Trim Catalog

- **METAL BASES**
- **METAL COVE MOULDS**
- **METAL CHAIR RAILS**
- **METAL BLACKBOARD MOULDS**
- **METAL CHALK TROUGH**



MILCOR PRODUCTS FOR SCHOOLS

MILCOR VENTILATORS AND SKYLIGHTS

The Milcor "Nu-Air" is a steel top syphon Ventilator. Breakers and deflectors inside the wind band produce positive suction regardless of wind direction, and insure against back draft at all times. Its design takes into consideration all influencing conditions and compels it to function at all times.

The Milcor "Spinner" Ventilator has great exhaust capacity. The slightest breeze keeps it operating efficiently. As the head revolves, the air in the ventilator is expelled creating a vacuum which draws the impure air from the building. Down drafts are an impossibility with this construction.

The Milcor Line of Skylights covers all types and sizes. We furnish recommendations to meet special requirements.

Send for literature describing and illustrating Milcor Ventilators and Skylights

MILCOR FIRE PROOF BUILDING MATERIALS

There is no better plaster base for walls and ceilings of school buildings than metal lath. Its scientifically designed mesh gives it a positive plaster grip. There is no plaster waste with this lath, and yet every inch of wall surface is locked permanently into place.

Expansion Casing provides a practical door and window trim. The flush-type junction of wall and casing insures a sanitary finish, with no cracks to become clogged with dirt.

Milcor Expansion Corner Bead is made for outer and inner angles, and its precisely true nose makes a neat, safe, straight line corner. The Expanded Wing, an integral part of the bead, permits the plaster to key through and form a strong bond with the lath beneath, protecting against corner cracks either from blows or strain due to settling.

MILCOR PARTITION SYSTEMS

These two systems are important contributions to fire-proof construction. The ease in which they can be constructed reduces labor cost considerably and at the same time makes possible partitions of exceptional rigidity and permanence. Certified fire-resistance makes them the partitions for school construction.

Milcor Steel Stud

MILCOR STEEL STUD FOR HOLLOW PARTITIONS

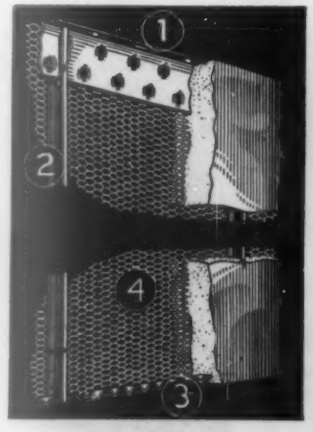
Sound resistance, insulating value, and resistance to shocks and abuse are a few of the outstanding advantages of this system. Write for detailed literature.

MILCOR SOLID 2 INCH PARTITION AND FURRING SYSTEM

Only four units comprise this system:

1. Ceiling Angle Runner
2. Slotted Channel Stud
3. Continuous Crimp Floor Runner
4. Milcor Metal Lath

Its labor saving simplicity reduces cost and speeds construction. Detailed literature supplied upon request.



Milcor 2" Solid Partition and Furring System

(ESTABLISHED 1857)

MUELLER COMPANY

Decatur, Illinois

FACTORIES: Decatur, Illinois; Sarnia, Ont., Canada; Los Angeles, Calif.; Chattanooga, Tenn.
BRANCHES: New York; San Francisco

28 STAINLESS STEEL PINS *punch out* all lime, alkali and corrosion every time adjusting handle is turned

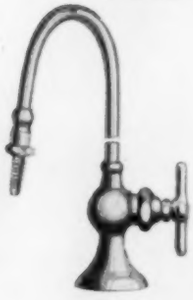
H-5425 Shower Head with self-cleaning device and adjustable ball joint

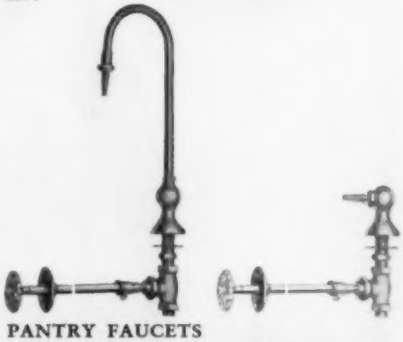
H-12080 Compression Swing Spout Faucet. Spout swings down into sink. Inlet and outlet have inside I.P. Threads

H-12085 Compression Double Swing Spout Faucet. Same as H-12080 except double supplies

H-12015 Ground Key Laboratory Stop with tapered corrugation for hose. Flat lever handle. Inside I.P. Thread

H-12017 Ground Key Laboratory Stop with tapered corrugation for hose. Flat lever handle. Outside I.P. Thread





PANTRY FAUCETS

H-12090 Four Arm indexed (cold) Faucet regularly supplied
H-12092 Remote controlled with Wheel Handle
H-12093 Remote controlled with Wheel Handle and Turret Top. Can be furnished with one, two, three or four nipples in turret

H-12020 Compression Laboratory Stop. Wheel handle and detachable hose nipple. Inside I.P. Thread

H-12040 Compression Laboratory Stop with detachable hose nipple and tee handle. Inside I.P. Threads

H-12125 "Y" Connection. ⅜" outside I.P. Thread inlet with ¼" inside I.P. Thread outlet

H-12130 "Y" Connection. Insde I.P. Thread inlet with outside I.P. Thread outlet

H-12145 Nipple with outside I.P. Thread inlet and tapered corrugation for hose outlet

H-12183 Turret with one outlet. Can also be furnished for two, three, or four outlets

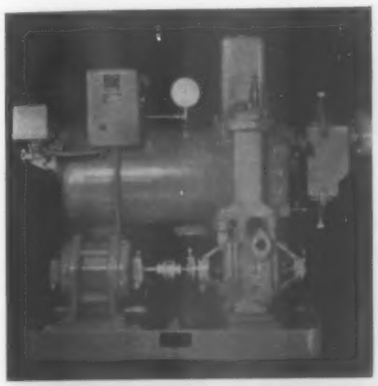
H-12050 Pedestal Laboratory Stop. Pedestal inlet ¾" or ½" inside I.P. Thread. Tapered corrugations for hose connections. Also furnished as one stop, three stop and four stop fittings

Send for a copy of Mueller Laboratory Brass Goods catalog. Fully illustrated with complete data as to sizes and finishes available

THE NASH ENGINEERING COMPANY

222 Wilson Road — South Norwalk, Conn., U. S. A.

SALES AND SERVICE OFFICES IN ALL PRINCIPAL CITIES



JENNINGS RETURN LINE VACUUM HEATING PUMPS

Standard with the heating industry for over sixteen years. Jennings Pumps remove air and condensation from the return lines of vacuum steam heating systems, discharging the air to atmosphere and returning the water to the boiler.

Two independent pumping units are combined in a single casing—an air unit which handles only air, and a water unit which handles only water. The capacity of each unit is simultaneous capacity. Each handles the full rated capacity independent of the other. Impellers of both are mounted on the same shaft. The pump is bronze fitted throughout.

Supplied either direct connected to standard electric motors, for belt drive, or for steam turbine drive. For continuous or automatic operation against pressures up to 40 lbs. Supplied standard in capacities up to 300,000 sq. ft. E.D.R. Bulletins on request.

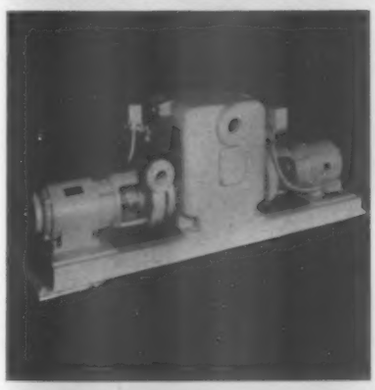
JENNINGS VAPOR TURBINE VACUUM HEATING PUMPS

The Jennings Vapor Turbine Heating Pump combines all of the advantages of the Standard Jennings Return Line Heating Pumps with a new type of drive, a specially designed low pressure turbine which operates directly on steam from the heating mains on any system, requiring a differential of only 5 in. of mercury, and returns that steam to the heating system with practically no heat loss.

This pump affords the economy which goes with a continuous condensation return and steady vacuum, and at no cost for electric current.

The Jennings Vapor Turbine is a safe heating pump, for it functions as long as there is steam in the system, entirely independent of electric current failure. Ideal for Greenhouse, School, and Hospital service.

Furnished standard in capacities up to 150,000 sq. ft. E.D.R. Bulletin on request.



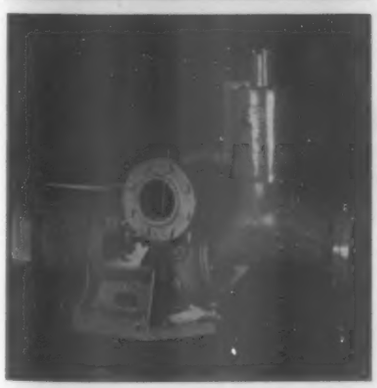
JENNINGS CONDENSATION PUMPS

Jennings Condensation Pumps remove condensation from radiators in return line steam heating systems and pump condensation back to the boiler.

Jennings Condensation Pumps are sturdy and compact in construction, and combine receiving tank, pump and driving motor in a single assembly. Bronze fitted throughout, with Tobin bronze shaft. Impeller is of special design adapted to handling hot water with highest efficiency.

They efficiently remove condensation from radiators, particularly those set below the boiler water line level. Pump casing forms part of return tank, making a compact structure that conserves floor space. Rectangular construction permits installation in corner or against wall.

Jennings Condensation Pumps are furnished in standard sizes with capacities ranging from 1½ to 225 g.p.m. of water, for serving from 1,000 to 150,000 sq. ft. equivalent direct radiation. Bulletin on request.



JENNINGS SUMP AND SEWAGE PUMPS

The Jennings Suction Sump Pump is a self-priming centrifugal pump for handling seepage water and liquids reasonably free from solids. The Suction Sewage Pump is fitted with a non-clog type impeller. Pumps are mounted entirely above the sump where they are always readily accessible. Only the suction pipe is submerged.

There are two moving parts: the centrifugal impeller and the vacuum priming pump rotor. Both rotate without metal-to-metal contact in the casing. Both are mounted on the same shaft that carries the rotor of the electric driving motor, making a compact assembly.

These pumps may be installed away from the pit, or directly over the pit. The Pedestal Type Jennings sets directly on the pit cover, requiring no other foundation.

Capacities and heads to meet all requirements. Bulletins on request.

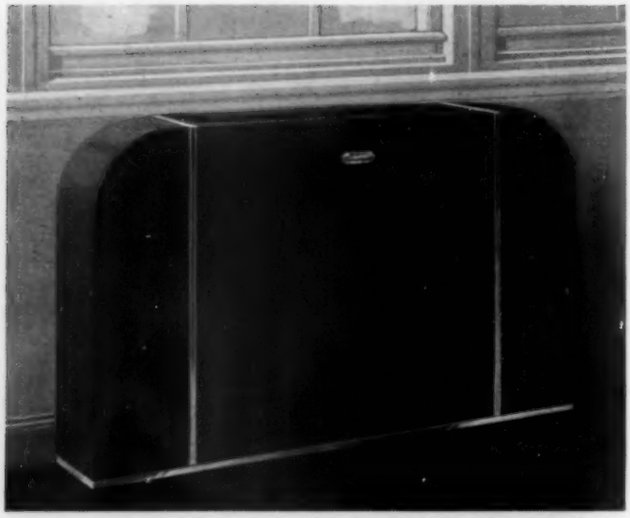
JOHN J. NESBITT, INC.

Manufacturers of

Heating, Ventilating and Air Conditioning Equipment

Holmesburg, Philadelphia, Pa.

11 Park Place, New York City



THE NESBITT SYNCRETIZER

has completely revolutionized standards of schoolroom heating and ventilating. Fully automatic, and doubly controlled by a room thermostat and an airstream thermostat, this advanced heating and ventilating unit harmonizes, or **syncretizes** room and airstream temperatures, thus producing Syncretized Air . . . constant spring weather indoors.

Fresh Air Without Drafts or Overheating

Nesbitt Syncretizers are adjustable, according to any state's requirements, to deliver all or part outdoor air, but always some outdoor air, to occupied classrooms. Nesbitts' insistence that outdoor air ventilation is regularly needed to maintain comfort and health and to abate odors has the weighty backing of nearly all state laws, of the American Society of Heating and Ventilating Engineers, and of the latest researches. The Air-Stream Minimum Temperature Control provides that all air taken from outdoors is first warmed to a safe minimum temperature, thus preventing drafts. The Room Temperature Control assures that the desired room temperature will be uniformly maintained, without permitting overheating.

Beautiful–Quiet–Economical

The Nesbitt Syncretizer is uniquely modern in appearance, yet its beauty is entirely conformable to schoolroom design. Tests have proved it to be the quietest of units. But the point which wins it greatest favor with school boards is its surpassing economy of fuel.

Widespread Acceptance

Today, in over 70,000 schoolrooms of the United States and Canada, more than two million girls and boys enjoy the health and comfort of vital air, properly filtered, tempered and distributed according to the best scientific knowledge, by heating and ventilating units manufactured by John J. Nesbitt, Inc., or its constituent, the Buckeye Blower Company.

Nesbitts' Answer to the "Orange-Crate Craze"

Increasingly popular has become the idea advanced by Nesbitts' for doing away with the unsightly orange crates often used for storage purposes in schoolrooms. They suggested the use of built-in shelves and storage cabinets along the windows, integrated with Nesbitt Heating and Ventilating Units, thus bringing the school adequate storage facilities for the projects and materials that are a necessary part of today's curriculum.

To make the idea practicable the Nesbitt Syncretizer is provided, if desired, with special casings designed to effect an appearance of coherent beauty when combined with built-in storage units. Nesbitt Auxiliary Convectors are also available in exterior casings to suit the ensemble. The storage cabinets or shelving sections may be specially fabricated of wood or steel according to the architect's plans, or may be obtained in standard steel units of several manufacturers.

First to bring "Perpetual June" to the classroom through the introduction of Syncretizer heating and ventilating units, Nesbitts are again first in relating ventilator and radiator design to the needs of the modern classroom.

Unit Casings to fit with Storage Units eliminate unsightly orange-crate shelves

Nesbitts will gladly co-operate with any school board or architect in embodying this practical idea in the construction of a new school or the remodeling of an old one. Full particulars will be mailed on request—Publication No. 225, Section G.

NESBITT *Syncretized Air*

PERPETUAL JUNE IN THE CLASSROOM

Nesbitt Syncretizers are sold by American Blower Corporation, and John J. Nesbitt, Inc. Complete information is contained in Publication No. 231. For engineering data, Publication No. 225.

B. F. STURTEVANT COMPANY

Heating, Ventilating, Air Conditioning and Vacuum Cleaning Equipment

MAIN OFFICE AND WORKS

Hyde Park, Boston, Mass.

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Mexican Representative: **E. N. MacKINNEY,** Ingeniero, Gante 8, Suite 42, Mexico, D. F.

The Cooling and Air Conditioning Division of B. F. Sturtevant Company, Hyde Park, Boston., Mass.

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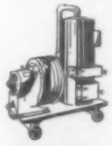
Sturtevant
REG. U. S. PAT. OFF.
Puts Air to Work

UNIT VENTILATOR

A combined steam heating and ventilating unit widely used in schools and other places. Finished in duco of any standard color. Stainless steel trim.

VACUUM CLEANERS



Portable

Central Systems

Sturtevant Vacuum Cleaners are made in both portable and stationary Central System types and in a variety of sizes to meet every school building need.

Features: Quiet operating vacuum producers, high suction for rapid cleaning under all conditions; tools designed individually for specific cleaning operations. Central Systems include piping recommendations to insure correct operation of the system.

SILENTVANE FAN

Backwardly curved blade type. A ventilating fan to meet the most exacting specifications, where very high efficiency and exceptionally low power consumption are required.

MULTIVANE FAN

Forwardly curved blade type. A highly efficient centrifugal ventilating fan of sturdy construction to meet the general run of ventilating requirements.

REXVANE FAN

The modern paddle wheel. Correct inlet blade curvature and stream line shrouding retain all good features of the old paddle wheel and greatly increase capacity.

CONVERTIBLE MULTIVANE FAN

This is a low speed centrifugal type fan with convertible and reversible housing, permitting quick conversion to any horizontal or vertical discharge.

VENTILATING SET

Direct connected; motor driven. For use with ducts, in ventilating small rooms, laboratory hoods and, in general, any room up to 10,000 cu. ft. contents.

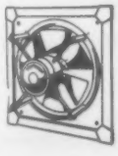
AIR WASHER

Built in several types to meet varying requirements in cleaning, cooling, dehumidifying and humidifying air.

FILTICOOLER

A compact, highly efficient, sectional type air washer. For filtering, washing, humidifying, cooling, and dehumidifying. Available in a range of sizes.

PROPELLER FAN

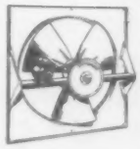


Built in fan sizes from 12 up to 45 in. Electric motors are available for both alternating and direct current, in wide variety of voltages.

PENT HOUSE

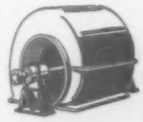
Sheet steel construction, with angle-iron framework. Includes automatic shutter. Made in range of sizes for Sturtevant Propeller Fans.

ATTIC FAN



A propeller type fan for installation in the attic, for cooling and ventilating. Range of sizes. Motors for various voltages, for a-c. and d-c.

MECHANICAL DRAFT FANS



Forced and induced draft fans to meet any need. Can be furnished with Sturtevant reduction gears and steam turbine, motor or engine drive.

PRESSURE BLOWER

A small, compact forced draft fan, with direct connected electric motor, for coal burning heaters in schools and other buildings.

SUSPENDED "SPEED HEATER"

Propeller fan type, for wall or ceiling installation. Fin type heating element. For steam pressures up to 200 lbs., capacities up to 300,000 B.t.u.

REXVANE SPEED HEATERS

Centrifugal fan type for floor, wall, or ceiling installation. Fin type heating element. For steam pressures up to 200 lbs., capacities up to 1,421,000 B.t.u.

THE POWERS REGULATOR COMPANY

48 Years of Temperature and Humidity Control

Chicago
2724 Greenview Avenue

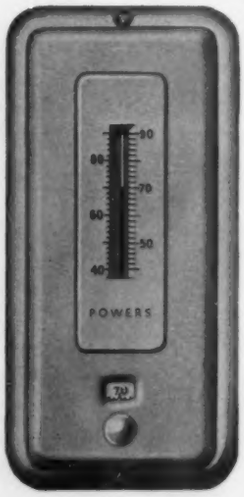
OFFICES IN 47 CITIES
See Your Phone Directory

New York City
231 E. 46th Street

AUTOMATIC TEMPERATURE AND HUMIDITY CONTROL

For Heating, Ventilating, and Air Conditioning Systems

At Harvard, Yale, Princeton, Vassar, Wellesley and hundreds of other prominent educational institutions will be found buildings equipped with the Powers Pneumatic System of Automatic Temperature and Humidity Control.



Forty-eight years of experience in developing and installing automatic control for heating, ventilating and air conditioning equipment in all types of old and new buildings qualify us to assist school executives, architects, and engineers on any problem of temperature and humidity regulation.

Powers pneumatic systems often cost more than other types but they are worth more because they often give 15 to 20 years of accurate and dependable control without repair expense.

Powers thermostats do not get out of adjustment permitting UNDER-heating and OVER-heating which not only wastes fuel but causes discomfort. Neither the extreme heat of Summer, sub-zero temperatures of Winter, nor the vibrations in some buildings, change their adjustment. They need no annual overhauling or adjustment, and the true gradual action of their powerful vapor disc controls valves or dampers gradually—resulting in exceedingly accurate regulation.

Write for Estimate. Let one of our engineers study your requirements and submit an estimate of the cost of installing the type of control best suited to your needs.

Self-Operating Controls. We also manufacture a very complete line of self-operating temperature regulators that do not require electricity or compressed air for their operation. **Write for bulletins,** if interested.

Some of the Many Schools, Colleges and Universities Using Powers Automatic Temperature Control

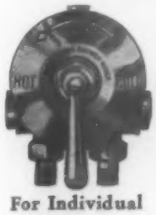
Amherst College
University of Arkansas
Ball State Teachers College, Muncie, Ind.
Bowdoin College
California Institute of Technology
University of Chicago
Converse College
Creighton University
Dartmouth College
Georgetown University
University of Georgia
Harvard University
Holy Cross College
University of Illinois
International Y. M. C. A. College, Springfield, Mass.
Iowa State College
University of Kansas City
Lafayette College
Lehigh University
Louisiana State University
University of Maryland
Massachusetts Institute of Technology
Massachusetts State College, Amherst, Mass.
University of Michigan
Midland College, Fremont, Neb.
University of Missouri
University of New Hampshire
Notre Dame University, South Bend, Ind.
University of Oklahoma
Oklahoma A and M College
Our Lady of the Elms College, Chicopee, Mass.
Purdue University
Radcliffe College
Sacred Heart College, Cambridge, Mass.
St. Joseph's College, Hays, Kansas
St. Joseph's College, West Hartford, Conn.
Smith College
State Normal College, Oswego, N. Y.
State Teachers College, Bridgewater, Mass.
State Teachers College, Lowell, Mass.
State Teachers College, Springfield, Mass.
Tarkio College, Tarkio, Mo.
Vassar College
University of Washington
Wayne University
Wellesley College
Wesleyan College
Western Reserve University
Wichita University
Williams College
Yale University
Yale University Anthropoid Station

and THOUSANDS OF PROMINENT GRADE, HIGH SCHOOLS AND PAROCHIAL SCHOOLS

SAFETY WATER MIXING VALVES

Safety Shower Mixers

A complete line of both pressure equalizing valve and thermostatic shower mixers that protect bathers from scalding temperatures caused by pressure and temperature fluctuations in pipe lines, and prevent sudden "shots" of hot or cold water. Maximum temperature of delivery can be limited.



For Individual Showers

Thermostatic Water Controllers

For group or gang showers, zone or progressive showers. Will mix hot and cold in quantities up to 100 gallons per minute and deliver at any temperature desired. Delivery temperature is not affected by temperature or pressure changes in the supply lines.

For Group, Gang or Progressive Showers

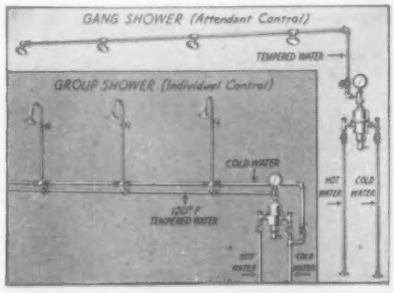
Group or Gang Shower Control—Powers Thermostatic Water Controllers are used for the control of shower baths in groups varying in size from 2 to 25 stalls. They may be used to establish a maximum temperature of hot water supply to protect the entire group from danger of scalding, or to place the entire group of showers under the control of an attendant.

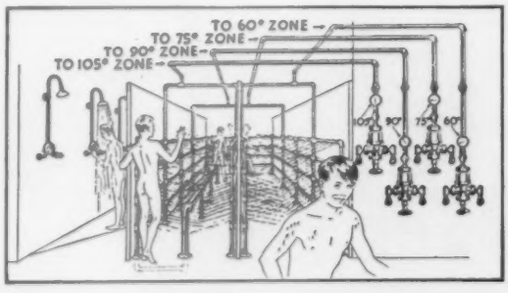
Individual Shower Control is best suited for adults as it permits each bather to individually adjust the temperature of his shower while the hot water is kept at a safe maximum temperature.

Attendant Control is best suited for the bathing of children in schools, institutions, etc., as the temperature of the entire group of showers is adjusted by one individual.

Zone or Progressive Showers—Where compulsory bathing is required before entering swimming pools, lane showers are divided into four zones, each controlled by a Powers Controller. First zone is maintained at 105° F.; second at 90° F.; third at 75° F.; and fourth at 60° F. Because of its efficiency and its hygienic and sanitary advantages, this type of shower is rapidly increasing in popularity.

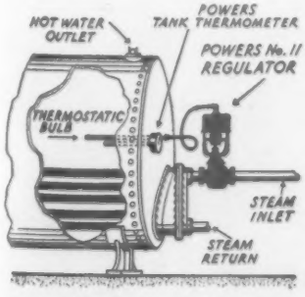
Write today for new 32-page Bulletin No. 258 which shows photographs of a variety of modern shower installations. It gives helpful advice in laying out shower rooms and completely describes Powers Safety Water Mixing Valves.





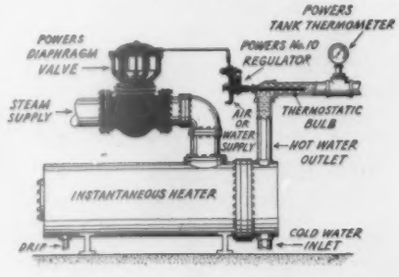
TEMPERATURE CONTROL FOR STEAM HEATED HOT WATER HEATERS

Self-Operating



The most complete line of money saving regulators for this purpose. Often pay for themselves during the first year and give dependable control for 15 to 20 years. All steam valve sizes up to 10 inches. **Write for Bulletin No. 2035.**

Compressed Air or Water Pressure Operated



WARREN WEBSTER & COMPANY

-since 1888 Webster Systems of Steam Heating

HOME OFFICE and FACTORY—Camden, N. J.

Pioneers of Vacuum Steam Heating

REPRESENTATIVES IN 60 PRINCIPAL U. S. CITIES

WEBSTER MODERATOR CONTROL "Control by the weather"

Heating steam consumption has been the subject of long study by Warren Webster & Company. An organized program of research has been carried on to provide a standardized, workable and reliable method for analyzing the steam consumption of heating systems; for the orderly determination of economies possible by application of improved equipment; and for the development of operating methods which could be applied to Webster Systems to increase the dollar return to users. As a result of this program standardized methods for analysis of performance and for the estimate of probable steam consumption are in regular use by the Webster organization.

With the thought that others will find the methods helpful, we have prepared the check list of questions below, each one of which refers to some one of the variable factors which we have found to affect heating steam consumption in one or more of the hundreds of cases examined.

Those who are interested are invited to discuss this entire subject of heating steam consumption with the nearest Webster Steam Heating specialist who has been provided with full details of the methods developed.

CHECK LIST OF FACTORS AFFECTING HEATING STEAM CONSUMPTION

Group I COMBUSTION

(1) Fuel
- (a) Price?
- (b) Quality?
- (c) Quantity?
- (d) Method and accuracy of measurement?

(2) Combustion equipment (burner, stoker, firebox, etc.)
- (a) Age, obsolescence of design?
- (b) Condition during period covered?
- (c) Adequacy of size?
- (d) Attainable efficiency of operation?
- (e) Skill of operation?
- (f) Continuous or intermittent operation?

(3) Boiler
- (a) Age, obsolescence of design?
- (b) Condition during period covered?
- (c) Adequacy of size?
- (d) Efficiency?
- (e) Skill of operation?
- (f) Water supply quality?

Group II STEAM CIRCULATION SYSTEM AND RADIATION

(1) Age of installation?

(2) Is piping adequately sized and properly graded?

(3) Is radiation adequately sized?

(4) Supply Valves, tight when off? Used to what extent?

(5) Radiator traps, adequate to discharge condensation and prevent air binding?

(6) Radiator traps tight or leaking steam?

(7) Automatic control equipment effect on steam consumption?

(8) Heat loss due to radiation from piping?

(9) Heating system operation, degree of skill?

(10) Heating System operation, suitability of installation for operating requirements?

Group III BUILDING, CHARACTER AND OCCUPANCY

Note:—Where comparison of two or more heating systems is in lbs. of steam per sq. ft. per season the variables resulting from Group I are eliminated entirely. It follows that lbs. of steam constitute a superior basis for comparison of the efficiency of steam distribution systems. The most available figure which takes into consideration the size and character of the building and to some extent its occupancy is the amount of installed radiation. But figures in lbs. per sq. ft. steam consumption must be checked against the points below.

(1) Installed radiation
- (a) Heat value assumed in figuring (240, 250, 260 BTU).
- (b) Ratio of installed radiation to required radiation?
- (c) Temperature range used in figuring installed radiation?
- (d) Wind velocity assumed in figuring installed radiation?
- (e) Extent of use of installed radiation?

(2) Other sources of heat
- (a) from lights?
- (b) from electric motors?
- (c) from occupants?
- (d) from sun?
- (e) other sources?

(3) Occupancy
- (a) Heating season, length?
- (b) Hours per day during which building was maintained to temperature?
- (c) Inside temperature maintained during occupancy?
- (d) Extent of occupancy (percent of building occupied during heating season?)

Group IV WEATHER AND OUTDOOR TEMPERATURE

(1) Season heating load, in degree days
- (a) for outdoor temperature below 65° F. (the basis of standard degree day calculation methods)
- (b) for difference between inside temperature maintained during occupancy and 65° for wind.
- (c) for wind?
- (d) Relative severity of seasons compared?
- (e) Unusual exposure factors (cloudiness, etc.)

It is obvious that the wastefulness of heating systems can only be due to the delivery of an *excess* of heat over that required. Conversely savings that may be made by improvement in heating installations cannot exceed the difference between *the heat now delivered and the heat actually required.* The determination of such savings rests, therefore, on (a) determination of the heat required, in itself an extremely difficult calculation involving consideration of many factors, and (b) the provision of means for controlling the distribution of heat delivery so as to conform it to the requirements at all times.

Webster Moderator and Hylo Systems provide the means for varying the amount of steam to all radiators according to outside temperature. Yet **heat delivery is continuous** with effective **fractional filling of radiators.** Webster Moderator Systems use an automatic Outdoor Thermostat supplemented by a manual Variation. Webster Hylo Systems provide manual control which can be made semi-automatic by adding an inside thermostat. Automatic turn-on and shut-off is obtainable for both types of systems by addition of electric time switches. Webster System Equipment used as needed includes **radiator supply valves, metering orifices for balancing steam distribution, radiator traps, drip traps, concealed convector radiators, unit heaters, strainers, boiler return traps, vent traps, boiler protectors, etc.**

Full details will be furnished on request. Our free book "Performance Facts" gives facts and figures concerning comfort and steam savings in 144 typical Webster installations.

KERNER INCINERATOR COMPANY

3701 North Richards Street, Milwaukee, Wisconsin

OFFICES AND AGENCIES IN OVER 150 CITIES

PRODUCTS

KERNERATORS: For the prompt, safe, and sanitary disposal of all kinds of rubbish (including garbage) by incineration. Manufactured in four types.

Flue-fed	Retort (downdraft)
Basement-fed	Gas-fired ("Commercial")

The characteristics and advantages of each type are described below.

SCHOOL BUILDING PROBLEMS SOLVED BY KERNERATORS

SAFETY

The KERNERATOR, by providing a place designed for burning all waste eliminates the fire hazard and the smoke panic hazard inherent in the collection and storage of such waste. Even baling paper sorted from other waste is a doubtful economy. This is especially so when weighed against the possible hazard.

SANITATION AND HYGIENE

The KERNERATOR provides a convenient, sanitary, and economical method for handling all sweepings, lunch remains, garbage from cafeteria (if there is one), and all promiscuous waste.

Flues may be so located that one set of hopper doors will open into the girls' washrooms. This idea has been adopted by a number of Architects (names upon request) with very satisfactory results in actual operation.

The KERNERATOR provides a means for the disposal of sanitary waste from girls' washrooms. In so doing the KERNERATOR eliminates both the disturbance to routine and the damage and maintenance expense of clogged drains.

ECONOMY

The KERNERATOR eliminates the expense of labor, time, and equipment in handling, storing and transporting rubbish and garbage; the necessity of daily collections of waste paper and sweepings—frequent trucking. It also cuts the cost of plumbing repairs due to drains stopped by sanitary waste in girls' washrooms.

APPLICATION

Flue-fed

This type offers the utmost in convenience, labor saving, and safety through immediate disposal of waste.

Central High School, Fort Worth, Texas
W. G. Clarkson Co., Architects

The incinerator chamber is located in the basement and the chimney which serves it acts as a chute for material deposited through the hopper doors on the floors above, and also as a flue to carry off the products of combustion when the incinerator is in operation.

The hopper doors located on upper floors assure maximum convenience by providing a means for the disposal of waste near the point of origin.

This type may also be fed from the basement direct into the incinerator chamber.

Basement-fed

In existing buildings where no flue is available either large enough to provide a fallway or located conveniently for hopper doors, a basement-fed KERNERATOR provides all of the advantages except the hopper door convenience described above.

Retort (downdraft)

This type is intended for special burning problems involving the use of fuel either in the form of dry waste or commercial fuel to burn waste which is too wet to burn without the aid of combustible waste or fuel.

Commercial

Where a compact, portable unit is desired for burning only garbage, the Kernerator Commercial is available. It is primarily a slow burning garbage destructor, using commercial fuel. Most economical and efficient operation is achieved by the use of soft coal, although gas can be used as fuel. Each unit is capable of handling the drained but wet garbage from 600 to 800 cafeteria meals per day.

REPRESENTATION

The KERNERATOR is made and sold by the pioneer in the flue-fed incineration field with agents located in all principal cities. Satisfactory operation is guaranteed by a financially sound organization having a stable, trained corps of incinerator experts with a wide experience in school installations.

FURTHER INFORMATION

When you are planning a school building, may we send a specialist to discuss your waste disposal problems? He will be glad to recommend the proper type and size of equipment depending upon the number of rooms, number of pupils, and the height of the building.

Roxbury Latin School, West Roxbury, Boston, Mass.
Perry, Shaw & Hepburn, Architects

SPEAKMAN COMPANY

Wilmington, Delaware, U. S. A.

INSTITUTIONAL SHOWERS—SHOWER HEADS—LAVATORY FIXTURES—SINK FIXTURES —SI-FLO (SILENT) FLUSH VALVES

S-1110—SPEAKMAN CENTURY BUILT-IN MIXOMETER SHOWER. Size, ½-inch. Mixometer with *Monel* renewable seats. Wall type Anystream Self-Cleaning Shower Head, key operated and drilled for expansion or thru bolts

S-1160—SPEAKMAN CENTURY EXPOSED TWO-VALVE SHOWER. Size, ½-inch. Valve center with cast lugs *Monel* renewable seats, swivel discs and encased washers. Supplies to overhead 36 inches long. Anystream Self-Cleaning Shower Head with lock-shield control

S-1110

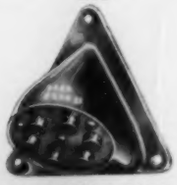
S-1160

Normal Spray

Needle Spray

Flood Spray

S-2250—SPEAKMAN (Patented) ANYSTREAM SELF-CLEANING SHOWER HEAD with lever handle control. ½-inch I.P.S. inlet. Ball joint not furnished unless specified



S-2260—SPEAKMAN (Patented) WALL TYPE ANYSTREAM SELF-CLEANING SHOWER HEAD. ½-inch I.P.S. inlet

The Speakman Company makes a complete line of showers, shower heads and plumbing fixtures, designed for use in schools, colleges, universities and institutions. In designing this equipment, particular attention has been given to water economy, as well as cost upkeep. Speakman Showers and Fixtures are sturdy in construction and easy to operate, and all parts subject to wear are renewable. Herewith are illustrated a few of the more popular items in the Speakman institutional fixture line. For full information, including illustrations, roughing-in measurements and other technical data on the complete Speakman line of showers and fixtures and the Si-Flo Flush Valve, we refer you to the Speakman Catalog "S."

GANG OR RUNWAY SHOWERS FOR SCHOOLS

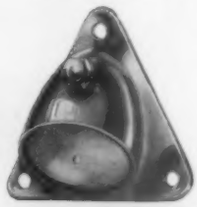
Speakman Runway Shower Installation Showing Gang and Individual Showers

The purpose of gang or runway showers is to bathe groups of persons quickly and economically. Gang showers are generally installed in schools, gymnasiums, swimming pools, or where bathing is compulsory. Full equipment includes a battery of thermostatically controlled gang showers, a battery of individual showers, and an antiseptic foot bath. Speakman are specialists in planning runway showers and will gladly assist in preparing runway shower layouts.

S-2255—SPEAKMAN (Patented) ANYSTREAM SELF-CLEANING SHOWER HEAD with lock-shield control. ½-inch I.P.S. inlet. Lock-shield arranged to operate by a key

S-2410—SPEAKMAN (Patented) ADJUSTA-SPRAY SHOWER HEAD with integral ball joint. ½-inch I.P.S. inlet

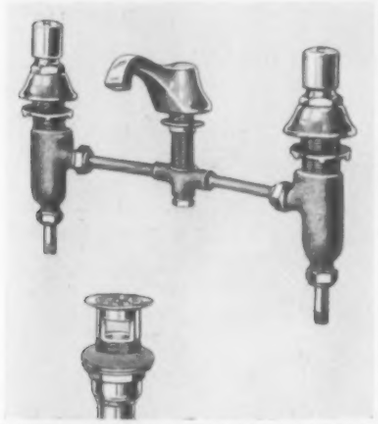
S-2420—Same as S-2410 but with lever handle volume control



S-2450—SPEAKMAN (Patented) WALL TYPE VANDAL-PROOF ADJUSTA-SPRAY SHOWER HEAD. ½-inch I.P.S. back inlet

K-9000 — SPEAKMAN Si-Flo (Patented) Closet Flush Valve. Has 1-inch capped angle stop for right or left inlet, wall flange, metal oscillating handle, flush connection, spud coupling nut and flange for 1½-inch top supply

K-9056 — Si-Flo Seat Action Closet Flush Valve with 1-inch straight stop, flush connection for 1½-inch top supply, adjustable bar check-hinge, black hard rubber open-front seat less cover



S-4170—SPEAKMAN COMBINATION PUSH-BUTTON METERING LAVATORY FIXTURE. (Patented.) Indexed metal push-button. External volume adjustment. Non-clogging by-pass. Non-hammering, renewable operating unit. ¼-inch threaded tailpieces. Cast P. O. plug with set-screw strainer plate and 1¼-inch O. D. tailpiece

S-4150—Similar to S-4170 but with Pop-up Drain

S-4160—Similar to S-4150 but chain and rubber stopper and cast P. O. Plug

Speakman Si-Flo Flush Valve

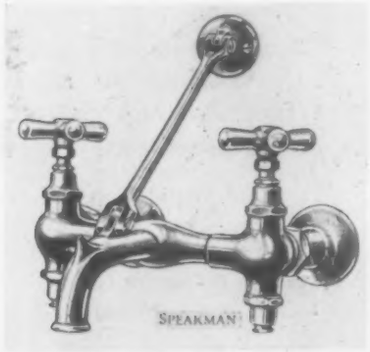
The Si-Flo Flush Valve eliminates all noises heretofore associated with flush valves, because these noises are prevented from forming. The Si-Flo Flush Valve is quiet in operation, is efficient, and works equally as well under high or low water pressure. This flush valve roughs in on standard measurements and can be used for new installations or to replace noisy flush valves. It can be furnished with right, left or back supply; built in the wall or seat-action type. The Si-Flo Flush Valve can also be supplied for urinals and metering showers. See K-2 Catalog for our complete line of Si-Flo Flush Valves.

Back-Syphon Preventer

Sanitary codes in many cities require a vacuum breaker to prevent back-syphonage. The Speakman Back-Syphon Preventer can be furnished on all types of Si-Flo Flush Valves when so specified.

Sink, Bath and Lavatory Fixtures

Speakman sink, bath and lavatory fixtures are designed to give the maximum of service. Each fixture is accurately machined and thoroughly tested under high water pressure. All valve parts subject to wear are renewable. The swivel disc encasing the washer evenly distributes wear on the washer and seat. Monel renewable seats and washer-screws are used because of Monel's resistance to the corrosive action of certain types of waters. Speakman sink, bath and lavatory fixtures are attractively designed and will fit all types of vitreous china and cast enameled iron or formed metal ware fixtures with standard drilling. For complete listing with illustrations of the complete Speakman line, we refer you to our general Catalog "S."



S-4800—SPEAKMAN EXTRA HEAVY SERVICE SINK FIXTURE. Size, ¾-inch. Female inlets 8 inches center to center, with adjustable flanges. All wearing parts renewable. Nozzle with bucket-hook and brace

K-9000-BSP SPEAKMAN Si-Flo (Patented Closet Flush Valve with Si-Flo Back Syphon Preventer. Has 1-in. capped angle stop on right. Flush connection, spud coupling and flange for 1½-in. top supply bowl

K-9082 — SPEAKMAN Si-Flo Urinal Flush Valve for stalls. Has ½-inch capped angle stop for right or left inlet, wall flange, metal oscillating handle, flush connection, spud coupling nut and flange for ¾-inch top supply

S-4320—SPEAKMAN PUSH-BUTTON SELF-CLOSING METERING FAUCET. (Patented.) Indexed metal push-button. External volume adjustment. Non-clogging by-pass. Non-hammering, renewable operating unit. ¼-inch I.P.S. thread on tailpiece. Code type nozzle with stream regulator

Catalog "S"

A copy of the Speakman Catalog "S", containing complete data on their full line of showers and fixtures, will be sent upon request to those in direct position to specify equipment.

THE CHICAGO HARDWARE FOUNDRY CO.

SANI-DRI DIVISION

North Chicago, Illinois

SANI-DRI for HAIR DRYING

MODELS TO MEET ALL REQUIREMENTS

SANI-DRI hair-driers dry *quickly* and *thoroughly* right down to the scalp. They facilitate the speedy clearance of dressing rooms and thus aid in the maintenance of class schedules. Schools with swimming pools report that SANI-DRI electrical hair-driers greatly reduce the number of colds due to "swim-wet" hair, aiding student health and promoting regular class attendance. All working parts of SANI-DRI are completely encased —it is therefore absolutely safe for users. All air is drawn through a screen protecting against hair being drawn into motor or fan. There are models of SANI-DRI to meet every requirement.

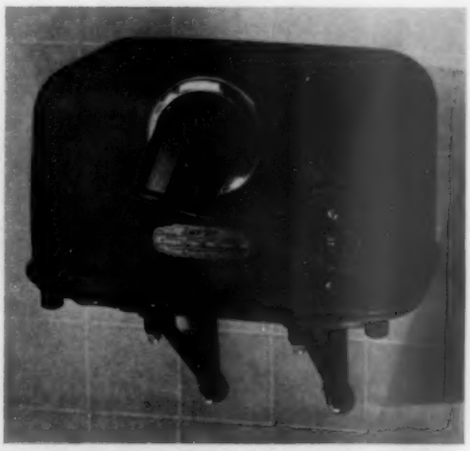
Model "SF-W" SANI-DRI

This wall-mounted model, with a *permanent porcelain* finish, is equipped with push-button control and a correctly timed automatic cut-off. It has a full-turn swivel nozzle adjustable to any position for users of various heights. Completely encased working parts ensure absolute safety for users. Provides a superior, *quick* and *thorough* hair-drying service.

Model "SF-W" with push-button control and *automatic* cut-off

Model "SF-W" SANI-DRI (Crackle Finish)

This model possesses all the advantages of regular Model "SF-W" except it is equipped with a manually operated instead of automatic switch control and is finished in crackle at lower cost to meet lower budget requirements. It has a full-turn swivel nozzle adjustable to any position. Completely encased working parts provide absolute safety for users. Like all models of SANI-DRI this one also dries the hair *quickly* and *thoroughly*, right down to the scalp.



Model "SF-W" with crackle finish and *manually* operated switch

Model "SF-C" SANI-DRI (Coin-operated)

This penny-operated model is installed where desirable to make a small charge for hair-drying service. It also has a full-turn swivel nozzle and properly timed automatic cut-off. Completely encased working parts provide absolute safety to users. Permanent porcelain finish and the same high grade mechanism and convenience of other SANI-DRI models ensure long, satisfactory hair-drying service.

NEW Model "SR-H" SANI-DRI (Semi-recessed)

This *new* semi-recessed wall model provides distinct advantages over other driers. The solid cast-iron box recesses in any wall that finishes four inches or more in thickness. For occasional oiling or cleaning, all working parts are made quickly accessible by the simple removal of two screws at bottom of cover. All air is drawn through a screen located at bottom of cover; completely encased working parts provide absolute safety for users. This model, with permanent porcelain finish, is smartly styled, has a manually operated switch and is equipped with the standard SANI-DRI full-turn swivel nozzle, adjustable to any position.

Illustrated literature, prices and specifications for any or all models will gladly be sent upon request

Right: **Model "SF-C", coin-operated, *automatic* cut-off**

Left: **Model "SR-H", semi-recessed. *Manually* operated switch**

CRANE CO.

Valves, Fittings, Pipe, Plumbing, Heating, Pumps

General Offices: 836 South Michigan Avenue, Chicago, Illinois

NATION-WIDE SERVICE THROUGH BRANCHES, WHOLESALERS, PLUMBING AND HEATING CONTRACTORS

A safe and satisfying drink from Crane school fountains of every type. (Right)—*The "fun" of care-free youth brings no maintenance headache when showers are Crane.*

Better planned to encourage health habits, Crane closets and urinals are a better buy for schools.

"Rough-house" in Crane-Equipped washrooms is not rough on the school budget.

Crane sinks and cabinets assure fine training for future housewives, and satisfaction for schools.

THIS FREE BOOK
Helps You Solve
SCHOOL
PLUMBING
PROBLEMS
—Send for a Copy—

SCHOOL SANITATION
for Today and Tomorrow

The emphasis on sanitation and health in today's school curricula focuses greater attention on school plumbing. To carry on this teaching successfully, requires sanitary equipment that meets the standards of today—that will defy obsolescence tomorrow.

School boards, superintendents, and architects will find Crane-Equipment a sound solution to the problem of maintaining sanitary facilities at peak efficiency at low cost. That's because Crane School Plumbing is designed to give maximum protection against contamination and spread of water-borne diseases—and because it is constructed to resist the severity of school service. The completeness of the Crane line provides for every school budget—for every architectural requirement.

CRANE'S SCHOOL PLUMBING GUIDE WILL HELP YOU EQUIP YOUR SCHOOL ADEQUATELY

The essentials of modern school sanitation are fully discussed in Crane's brochure, "The Importance of Sanitary Equipment in Schools." Based on thorough research and Crane's long experience in this field, it is an authoritative guide in the selection of plumbing equipment for the entire school. If you do not have a copy, write for one today. You'll find it invaluable.

CRANE

THE HALSEY W. TAYLOR CO.

Main Office and Factory: 137 North Street, N. W., Warren, Ohio

OFFICES IN THE FOLLOWING CITIES

Boston, Mass.	Buffalo, N. Y.	Newport News, Va.	Denver, Colo.	Los Angeles, Calif.
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	New Orleans, La.	Nashville, Tenn.	Kansas City, Mo.	

PRODUCTS

Halsey Taylor Sanitary Drinking Fountains and also Electric as well as Ice Coolers. Patented Automatic Stream Control, Two-Stream Projector, Non-Squirting Features.

DRINKING WATER SERVICE

Halsey Taylor Drinking Fountains are made and sold by the largest organization devoted exclusively to that line of manufacture. Our sole aim and purpose is to produce the best fountain for any need, and our entire resources and facilities are pointed toward that end. We aim to sell a service rather than a mere fountain and invite architects or builders to write us relative to any problems that may arise in connection with drinking-water provision.

These fountains embody distinctive features, resulting in the following advantages:

FEATURES

(1) Practical Automatic Stream Control—An automatic device maintains a constant height in the drinking stream, even though the line pressure may vary 50 pounds. The stream is never too high, never too low.

(2) Ideal Drinking Mound—The 2-stream projector was designed for and adopted by the Government during the war. This exclusive design makes the side stream really practical, and removes the objections found with ordinary sidestream foundations because of their hoselike stream.

(3) Absolute Sanitation—The drinking mound is formed by the converging of two streams of water, thus setting up an interference forming a localized drinking mound which makes it impractical to drink from any other point, therefore sanitary in the extreme. The finger or lips cannot come in contact with or contaminate the source of supply. It is absolutely impossible to squirt the water.

FOR ANY FEED

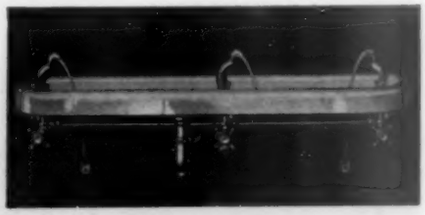
You will find fountains in the Halsey Taylor line to meet any requirements.

Halsey Taylor exclusive features are now available in cabinets for use with various types of electric refrigeration units.

Write for special literature.

NO. 2616

Illustrations show a few of vitreous china fixtures with patented Halsey Taylor features



NO. 2703

NO. 2601

NO. 2605

NO. 2609

CHOICE OF COLOR

All vitreous china fixtures shown in this catalog can be furnished in various colors to match the woodwork, marble, or interior trim.

MARBLE FOUNTAINS

Send for roughing-in measurements of Halsey Taylor fittings for marble, or terra cotta wall and pedestal fountains.

BLUE PRINTS

Blue prints giving details will be furnished for any fixtures shown.

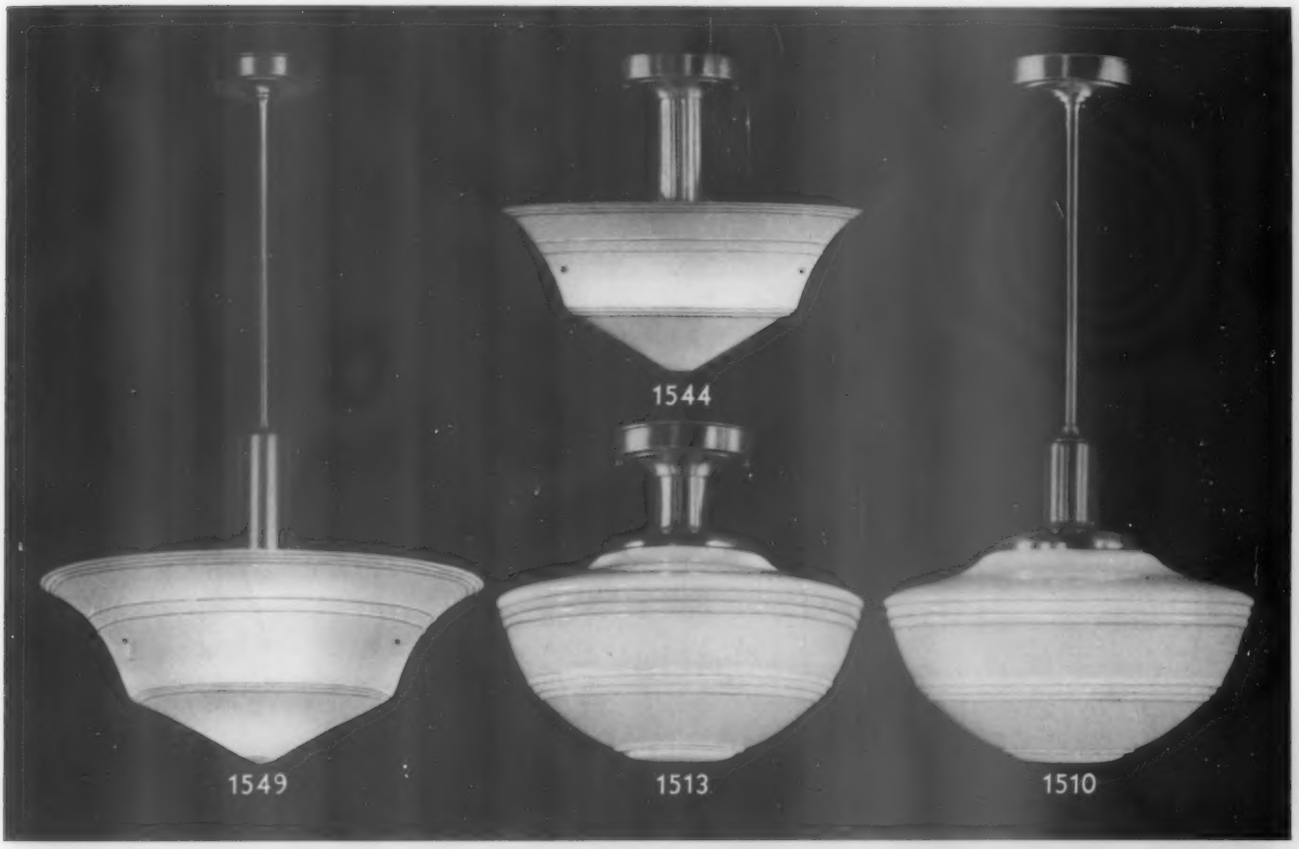
The complete Halsey Taylor line of pedestal, wall and battery types is illustrated and described in our latest Catalog. Send for your copy.

CHASE BRASS & COPPER CO.

INCORPORATED

Subsidiary of Kennecott Copper Corporation

Lighting Fixture Division 5 Thomas St., Waterbury, Conn.



CHASE COMMERCIAL LIGHTING FIXTURES

Chase fixtures for school lighting include two types; (a) semi-indirect plastic bowls, (b) glass enclosed bowls. The semi-indirect fixtures such as No. 1549 above, registered 87% light output by the Electrical Testing Laboratories, New York. The luminous bowl blends into the reflected light from the ceiling, and at the same time eliminates dark areas beneath the fixture.

The color of the light is a soft mellow honey color, easy on the eyes. The bowl is made of a plastic material, weighing 75% less than glass, non-shatterable, and not easily broken, and safe for children to work under.

The enclosing glass globe fixtures are constructed so that the glass is held from the inside. The glass is locked tightly without movable parts. The construction of the fixture permits the removal of the globe for cleaning and re-lamping, without difficulty.

An important feature of the glass enclosing bowl fixtures is the Chase concealed patented swivel for self-aligning.

Both types of fixtures are made of brass, properly plated in a lasting satin chromium finish. The brass is at least 22 gage and each fixture meets the standards set by the Board of Fire Underwriters and bears their label of approval.

We will gladly send specification sheets covering all our fixtures. Shall we send you our No. 13 Catalog?

CORNING GLASS WORKS
MACBETH-EVANS DIVISION

718 Fifth Avenue
New York

Charleroi, Pennsylvania

Room 7–141
Merchandise Mart
Chicago, Ill.

SCHOOL LIGHTING LUMINAIRES

Corning Glass Works manufactures and sells glassware only. Complete fixtures of the type illustrated below, and using Corning glassware, are procurable through local jobbers and dealers.

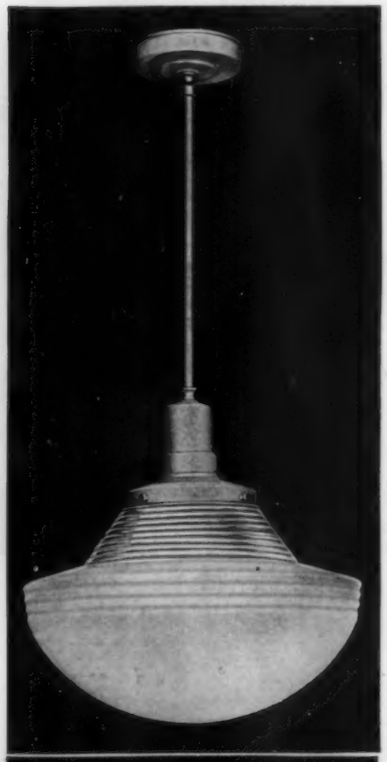
SEMI-INDIRECT LIGHTING

We consider the semi-indirect lighting system using an enclosing globe to be highly practical for classroom illumination. Favorably low globe brightness (freedom from glare) is combined with the ease of maintenance feature of enclosed construction.

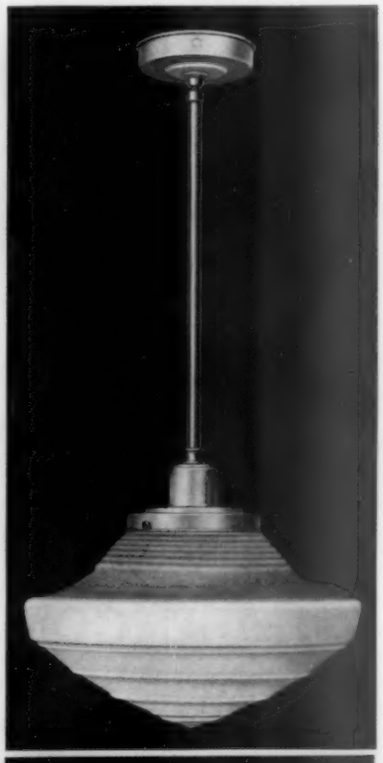
Corning offers semi-indirect enclosing globes made by a new process of manufacture (thermal opacification) which does not permit the globes to deteriorate in service.

Below are illustrated two patterns, "THE CAVALIER" and "THE ASTRON." Both meet lighting requirements of the school code "The American Recommended Practice of School Lighting."

"THE CAVALIER"



"THE ASTRON"



GALAX BRAND

(Semi-indirect)

"THE CAVALIER"

Available in a range of sizes

No.	Diam., In.	Depth, In.	Fitter, In.	Suggested Wattage
81663	14	9¾	6	200
81664	16	11	6	300
81665	18	12¾	6	500

"THE ASTRON"

Available in a range of sizes

No.	Diam., In.	Depth, In.	Fitter, In.	Suggested Wattage
81381	14	8⅞	6	200
81382	16	10 1/16	6	300
81383	18	11⅜	6	500

Hangers illustrated furnished through courtesy of The Art Metal Company, Cleveland, Ohio.

To specify use name and number.

IES Specification tests available upon request.

GENERAL DIFFUSE LIGHTING

The general diffuse enclosing globe system is the most economical method of classroom illumination. Use of a large size globe assures that the brightness will not exceed the limits suggested in the school code "The American Recommended Practice of School Lighting."

MONAX glass has long been recognized for its low light absorption and high diffusion. Thousands of MONAX globes are giving satisfactory service in schools throughout the country.

Below are illustrated two of the more popular patterns. Both are available in a full range of sizes.

"THE ORION"

MONAX GLASS

"THE ORION"

Using suggested wattage the surface brightnesses of "THE ORION" will be within the limits suggested in "The American Recommended Practice of School Lighting."

No.	Diam., In.	Depth, In.	Fitter, In.	Suggested Wattage
81391	9⅜	6½	4	75
81392	12⅜	8⅝	6	100
81393	14⅜	9⅞	6	150
81394	16⅜	11⅞	6	200
81395	18⅜	13⅛	6	300

"THE SEVILLE"

Available in a range of sizes

No.	Diam., In.	Depth, In.	Fitter, In.	Suggested Wattage
81119	8½	5⁹⁄₁₆	4	100
81316	10	6½	4	100
81317	12	7¾	6	150
81319	14	9	6	200
81320	16	10¼	6	300
81322	18	11⅜	6	500
81323	20	12¾	8	750

MONAX EXIT CUBE

We highly recommend the Exit Cube illustrated above for use in schools. The design is applied to three sides of this white glass cube, having a red background with white letters 5″ high. The bottom of the cube is not decorated, hence a flood of light is directed downward to the doorstep as an added safety feature.

The sides of this cube are 6″ square and it has a standard 3¼″ fitter. Specify or order by No. 81015 Design 44.

"THE SEVILLE"

CORNING GLASS WORKS — MACBETH-EVANS DIVISION CHARLEROI, PENNSYLVANIA

THE F. W. WAKEFIELD BRASS COMPANY

1940 Yearwood Park, Vermilion, Ohio

Over 30 Years in the Manufacture of Lighting Equipment

DISTRIBUTORS IN 104 CITIES

The COMMODORE

gives BETTER LIGHT for schoolrooms old and new . . .

- **Glareless, indirect light**
- **Molded from Plaskon**
- **Low maintenance cost**

THE Wakefield COMMODORE is scientifically designed with the express purpose of providing the right kind of light to protect the eyes of both pupil and teacher in the classroom. With its trim precision-molded shade of Plaskon, which weighs less than two pounds, the Commodore gives these advantages to users: 1. Unusually efficient indirect light. 2. Easy cleaning. 3. High degree of safety. 4. Far less breakage. 5. Low maintenance costs.

***BEFORE* AND *AFTER* IN ONE PICTURE**

This unretouched night photograph, taken outdoors to show indoor lighting efficiency tells at a glance how the COMMODORE improves seeing conditions. The upper room of this Ashland, Ohio, school was lighted with the old units; the lower with COMMODORES

Wakefield COMMODORES light the library, cafeterias and academic classrooms in the Maycomber Vocational School, Toledo, Ohio

Wakefield COMMODORES with photo cell control assure 20 footcandles on all classroom desks every day in Caledonia School, East Cleveland, Ohio

GIVES MORE LIGHT . . . BETTER LIGHT

The Commodore gives you 86% of the light from the bare bulb . . . more than most indirect units . . . according to Electrical Testing Laboratories, famous New York research and testing organization. And this light is restful and soothing to the eyes, because it is diffused through the Plaskon shade which is low in brightness. For best results, light-colored ceilings are necessary.

MODERNIZES SCHOOLROOMS OVER NIGHT

Many a school has found out the advantages of good light first hand without need for special appropriations, by relighting one classroom at a time. Thus, classrooms which used to seem old-fashioned, now seem like new . . . thanks to modern seeing conditions brought about by COMMODORES. Better light plus the COMMODORE'S simple, modern design, attractive white Plaskon shade and brushed aluminum shaft make a world of difference in the appearance of a room, and act as an inspiration to the people in it. Users tell us that the attitude, attentiveness and classroom work of pupils definitely improve when they begin to work in a classroom equipped with COMMODORES.

ASK FOR THIS HELPFUL BOOKLET

We shall be glad to send you, free, an interesting new 16-page booklet, entitled, "Classroom Lighting". It presents many important facts . . . points out the danger in depending too much on window lighting . . . gives case histories on results secured before and after better lighting . . . offers definite suggestions for securing good light. Ask also about our room-by-room relighting plan.

WESTINGHOUSE ELECTRIC & MFG. CO.

Edgewater Park **LIGHTING DIVISION** Cleveland, Ohio

Westinghouse provides a complete line of luminaires for lighting class rooms, study halls, auditoriums, lecture halls, corridors and stairways, cafeterias, libraries, laboratories, rest rooms and offices. This lighting equipment includes direct, semi-direct, luminous-indirect and totally-indirect luminaires.

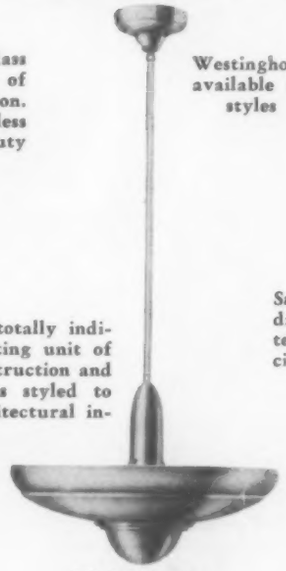
Because quality of light is as important as quantity, Westinghouse engineers have designed these lighting units to provide adequate, well-diffused illumination free from glare. They blend with any school architectural interior and are easily maintained.

Westinghouse offers, without obligation, a layout and engineering service to help you plan your illumination system. Descriptive information, including specifications and installation data, is available. Call your nearest Westinghouse distributor or write Westinghouse Electric & Manufacturing Co., Lighting Division, Edgewater Park, Cleveland, Ohio.

Interior Lighting Equipment

Magnalux, with Hi-Flec Glass Basin, sets a new standard of modern indirect illumination. Magnalux combines glareless lighting efficiency with beauty of design

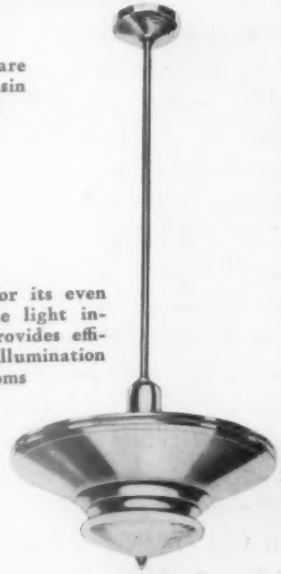
Magnalux



Westinghouse Luminaires are available in a variety of basin styles and hanger types

TI Luminaire is a totally indirect aluminum lighting unit of modern design, construction and performance. TI is styled to blend with all architectural interiors

TI Luminaire

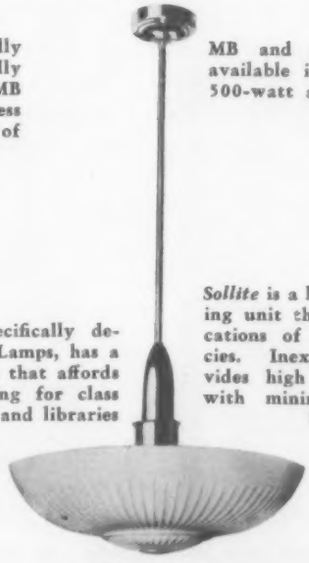


Silvurn is notable for its even diffusion of adequate light intensities. Silvurn provides efficient, economical illumination for class rooms

Silvurn

MB Luminaire is a new totally indirect luminaire specifically designed for Bi-post Lamps. MB provides abundant shadowless light for eye conservation of school pupils

MB Luminaire



MB and GB Luminaires are available in two sizes: a 300-500-watt and a 750-1000-watt size

GB Luminaire, specifically designed for Bi-post Lamps, has a Hi-Flec Glass Basin that affords well-diffused lighting for class rooms, study halls, and libraries

GB Luminaire

Sollite is a luminous direct lighting unit that meets the specifications of governmental agencies. Inexpensive, Sollite provides high intensities of light with minimum globe surface brightness

Sollite

GENERAL ELECTRIC COMPANY

General Office: Schenectady, New York

SALES OFFICES IN PRINCIPAL CITIES

GENERAL ELECTRIC AUTOMATIC LIGHT CONTROL

Assures Correct Schoolroom Lighting at All Times

An Automatic Thermostat Controls Your Heat — NOW You Can Have G-E Automatic Control for Your Light

In devising an inexpensive photoelectric lighting control unit for classrooms and study halls, the General Electric engineers have succeeded in solving a very vital school problem — the problem of minimizing eyestrain due to faulty lighting.

The application of the Photoelectric Relay to schoolroom light control is simple. A phototube, or "electric eye," is set up so that natural light from the windows falls on the tube. Variation in the amount of light striking the tube changes the current flowing in the tube. Amplified by a standard radio tube, this change operates a relay which in turn operates the lights.

Adjustment of the control unit is both simple and permanent. Two knobs located on the control panel in the room fix the light level at which the unit will turn on the artificial light and the level at which the artificial light will be turned off.

Students' eyes protected by G-E automatic light control in typical school room

Two Types

Two types of G-E Automatic Light Control are available—**flush**-mounted, and **surface**-mounted.

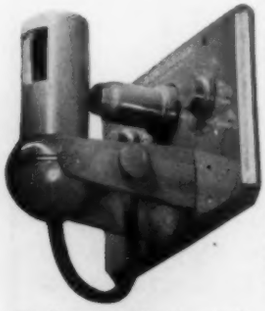
The **flush**-mounted model is best suited for installations in new buildings because it is to be installed on a three gang outlet box mounted in the wall.

The **surface**-mounted model can be used to advantage where it is not desirable to cut into the room walls.

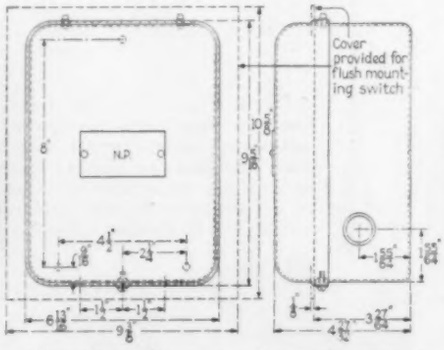
Connections to the lighting circuit of the building may be made at the regular wall switch.

Booklet

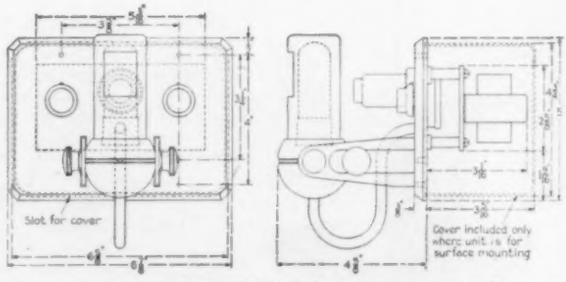
To those school executives or school architects interested in the details of G-E Automatic Light Control, we shall be glad to send a copy of our Booklet No. GEA-2606. Or a G-E representative will be glad to discuss classroom requirements with you, advising the proper type to meet your needs.



Wall-mounted room unit with light-sensitive phototube



Dimensions of remote relay and magnetic switch CR7500-P2A, for operating lights, flush- or surface-mounted



Dimensions of CR7505-D6A light sensitive control panel, flush- or surface-mounted

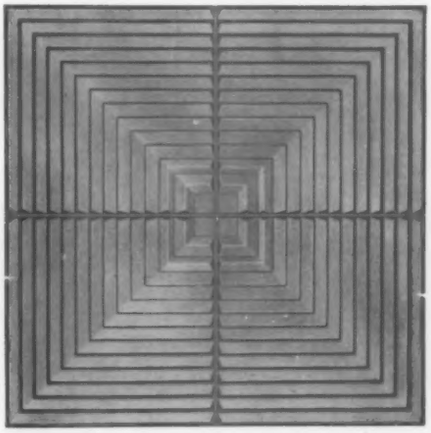
BERGER MANUFACTURING DIVISION

REPUBLIC STEEL CORPORATION

Canton, Ohio

WAREHOUSES: Boston — Cincinnati — Detroit — Philadelphia — St. Louis — Springfield, Ill. — Springfield, Mo.

PARAB-O-LUME LIGHT REFLECTOR UNIT



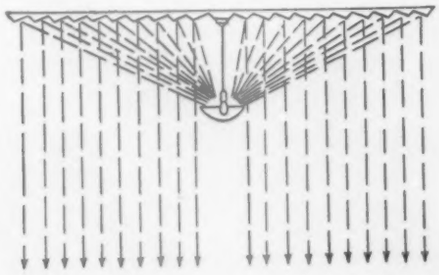
Parab-o-lume is made in standard size units of 6 x 6 ft., 8 x 8 ft., 10 x 10 ft., and 12 x 12 ft. Filler sections of similar design may be used to make other sizes

Takes light off ceilings—directs it upon working surfaces—provides more light — better light — eliminates glare — relieves eye-strain—and fatigue.

The Berloy Parab-o-lume Ceiling Unit represents one of the most progressive and most beneficial developments in lighting in years. Unique, functional and attractive in design, Parab-o-lume combines the benefits of both direct and indirect lighting, and at the same time eliminates their disadvantages and dangers.

Parab-o-lume is a reflector, which, when attached to the ceiling, efficiently utilizes the light rays from an indirect luminaire, bends the rays as they strike it and directs them downward upon the working surface—with a minimum of waste. In this way it increases materially the usable proportion of light produced, distributes it uniformly and puts it to work where needed.

Light rays reflected from a parabolic reflector



Light rays as reflected from Parab-o-lume

Parab-o-lume is a Parabola transformed to a flat surface. This has been accomplished by dividing the cross-section of the Parabola into numerous small sections and ingeniously transferring them to a flat surface.

This photograph shows a drafting room before Parab-o-lume was installed

The same room after Parab-o-lume was installed. Note the higher utilization of light in all areas—without glare

WESTON ELECTRICAL INSTRUMENT CORP.

601 Frelinghuysen Avenue, Newark, N. J.

ENGINEERING AND SALES OFFICES

Albany	Cleveland	Jacksonville	Minneapolis	Pittsburgh
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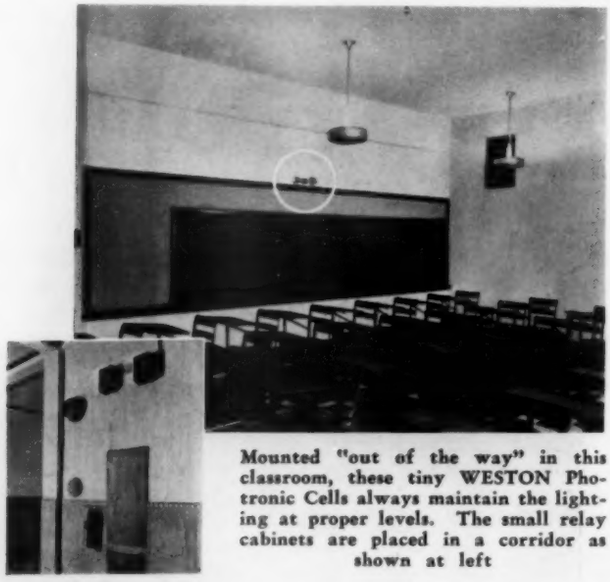
Cincinnati				Syracuse

AUTOMATIC ILLUMINATION CONTROL ends eye fatigue ... banishes the cause of most classroom failures

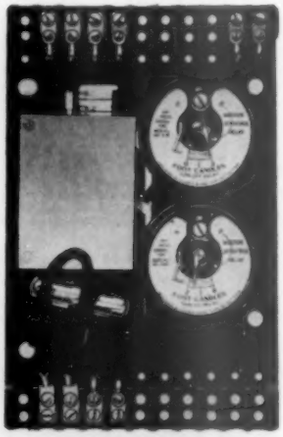
Schools everywhere are adopting WESTON Illumination Control because of its simplicity and proved dependability.

Simple, inexpensive, and easy to install in new or old buildings, WESTON *Photronic Illumination Control exactly meets school requirements for a device which will automatically maintain classroom lighting at proper levels, and thus banish the eye-strain and tension which result from eye-fatigue.



Mounted "out of the way" in this classroom, these tiny WESTON Photronic Cells always maintain the lighting at proper levels. The small relay cabinets are placed in a corridor as shown at left

A typical WESTON installation, one of many throughout the country, is shown above. Note that only the small Photronic (dry type photo-electric) cell need be mounted in the classroom. The cell is wired to the compact relay panel which can be placed "out of the way" . . . in a closet, corridor, or even in the basement. That's all there is to a WESTON Photronic installation; for no amplification is necessary; no other auxiliary equipment used. The operation, too, is simple. The relays on the control panel are quickly adjusted to turn the lights "on" and "off" at predetermined lighting levels. From then on, operation is entirely automatic; there is nothing to change or adjust during years of dependable operation.



Close-up of WESTON Photronic Relay cabinet, showing "on" and "off" relays

In addition to this proved and preferred method of automatic lighting control, WESTON also supplies the WESTON direct-reading Foot-Candle Meter shown below. Placed on a desk, or held in any classroom location, it instantly shows the amount of light (daylight or artificial) available at that location. Thus by quick, periodic check, it can be ascertained whether or not each pupil has the proper amount of light for proper seeing.

WESTON'S long and broad experience in automatic illumination control in schools throughout America is at your service to help you apply it to local needs and conditions. Call on the WESTON representative in your vicinity, or write direct to Newark for further details. Weston Electrical Instrument Corporation, 601 Frelinghuysen Avenue, Newark, New Jersey.

WESTON Model 703 direct-reading Foot-Candle Meter

*** Photronic—A registered trademark designating the photoelectric cells and photoelectric devices manufactured exclusively by the Weston Electrical Instrument Corporation.**

CONNECTICUT TELEPHONE & ELECTRIC CORP.

Manufacturers of Communicating, Signalling and Fire Alarm Equipment

Meriden, Connecticut

BRANCH OFFICES IN PRINCIPAL CITIES

Dial-O-Phone for Central and Inter-communicating Systems

Connecta-phone for Room and Outlying Stations

Annunciator for Dormitory Return-call Systems

New Connectabell with Sealed Motor—plugs in at standard outlet box

PRODUCTS

Telephones — Inter-communicating, Dial, Center-phone, Return-Call and Switchboard Systems

Annunciators—for Telephone, Signal and Dormitory Return-Call Systems

Bells and Push Buttons—All types for Signal and Alarm Systems

Fire Alarm—Bells, Calling Stations, Panels for all types of Systems

Laboratory Control Panels—Custom-Built Panels for every electrical requirement

Program and Cross-Connecting Boards—for Bell Systems

ADVISORY PLANNING SERVICE

Through a staff of more than 30 experienced Signal Engineers throughout the United States and Canada, CONNECTICUT offers a free Advisory Planning Service to assist school and college officials, architects, engineers, and contractors in the selection and installation details of inter-communicating, signalling and fire-alarm systems.

The functions of this service are:

1. The Connecticut Field Engineer attends preliminary consultation on objectives of the system and offers general suggestions on equipment and specifications.
2. The Field Engineer forwards his report and plot plan (we to assume any expense entailed) to the Engineering Department at the factory.
3. The factory prepares detailed specifications and tentative riser diagrams which are returned and submitted for further discussion.
4. When acceptable, final riser diagrams showing all details of the system are made by us from the original plot plan and bound, with specifications, in convenient form to facilitate the most efficient and accurate installation by the electrical contractor.

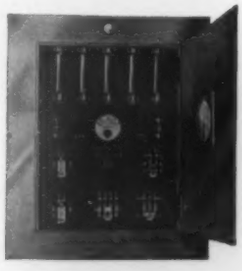
There is no charge or obligation for this service. It is maintained for the sole purpose of making every CONNECTICUT installation completely satisfactory in every respect.

Fire Alarm Stations of All Types—
Break-glass (left); Code-call (right)

Telephone-Annunciator Systems

Private Exchange Switchboards of All Types

Room Station for Dormitory Return-call Systems



Fire Alarm Panels for Any type of System

GRAYBAR ELECTRIC COMPANY

Executive Offices: Graybar Building, Lexington Ave. and 43rd Street
New York, N. Y.

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PRODUCTS

The Graybar Electric Company, brings to meet any and every electrical need for schools and colleges, more than 60,000 electrical supplies—supplies whose dependability is warranted by Graybar's 71 year old quality reputation.

The 82 distributing houses listed above bring these supplies within arm's reach of demand everywhere, making instantly available everything electrical, to transmit, apply and control electricity in school and college buildings.

INTER-COMMUNICATION

School boards, superintendents, and architects can well appreciate the importance of an interior telephone system that knits all the individuals of the teaching staff together—without, at the same time, requiring the services of an operator. Graybar Inter-Phones are simple to operate. The user merely pushes a button to make a connection.

In addition, Graybar offers the Webster Teletalk and all types of electrical signaling equipment for schools, including bells, buzzers, annunciators, and gongs. Write us for more detailed information.

PROGRAM AND SOUND SYSTEMS

We can now supply complete school systems covering Telephone Communication, Fire Alarm, Program Clocks, Laboratory Switchboard and Panels, Complete Public Address or the Program Sound System which is a two channel type arranged to provide pick-up from microphones, phonograph reproducers or an all-way radio receiver on either channel and will provide two programs simultaneously. It is possible to select any one of the pick-ups, amplify it and distribute the program to any one or all the speakers in the class rooms at the same time.

LIGHTING EQUIPMENT

A complete selection of fixtures, glassware and accessory products to meet the specialized needs of school and college buildings is quickly available through Graybar.

Lighting specialists from Graybar can help architects and school boards secure the most efficient installation. The Graybar Electric Company has given the problem of proper school lighting special study and has developed the most complete line of lighting fixtures and glassware suited to school and college needs.

LAMPS

Mazda Lamps are available on quick call at Graybar Electric Company distributing houses located in 82 principal cities throughout the country.

These well-known, extremely efficient lamps are stocked in the five standard sizes—25, 40, 60, 100 and 200 watts—adapted to simplify ordering.

WIRE AND WIRING SUPPLIES

Graybar Electric Company distributing houses carry large stocks of wiring supplies for power, light and inter-communication construction and maintenance. This includes wire, conduit, wiring devices, connectors, etc., for all purposes. All materials are of the highest quality, the products of long established, well-known manufacturers.

60,000 OTHER ITEMS

The above products cover only a very small portion of the 60,000 products distributed by Graybar. For complete information covering these or other electrical products for schools and colleges, address the nearest Graybar office, or Graybar Electric Company, Lexington Ave. and 43rd St., New York, N. Y.

THE GAMEWELL COMPANY

Newton Upper Falls, Massachusetts

BRANCH OFFICES

New York	Atlanta	Chicago	Denver	Los Angeles
Chicago	Pittsburgh	Dallas	Detroit	Montreal, Canada

FIFTY SCHOOL FIRE DISASTERS SINCE 1900
Involving Loss of More Than 400 Lives

"The public apathy is such that a holocaust involving loss of life creates only a momentary sensation of horror which is soon forgotten."

A fire alarm system, constantly and automatically supervised, which transmits the alarm instantly and directly to the fire department and at the same time provides for the orderly evacuation of the building is essential to protection of life and property.

The Gamewell Company, pioneers in the art of fire alarm telegraphy since its inception, has specialized in the development, manufacture and installation of fire alarm and other emergency signaling systems for municipalities, schools, institutions and industrial properties. Gamewell systems are now in service in all parts of the civilized world, including some two thousand municipalities and several thousand schools, institutions and commercial establishments.

In Gamewell fire alarm systems are incorporated the net results of an unequaled experience of over seventy years in this field.

Master Fire Alarm Box City Type—Surface Mounting

There are three types of fire alarm systems:

1. **The Dualarm System**—for smaller schools and institutions—directly connected with the municipal fire department where such connections are available. Local battery power not required.
2. **Proprietary Systems**—for colleges and institutions of sufficient size to warrant the installation of a complete signaling system, each including a central operating and supervising station at the protected property.
3. **Exit-Alarm Systems**—efficient, simple and inexpensive for schools, dormitories, fraternity houses, residences, etc., where connections with municipal fire departments are not available.

THE GAMEWELL DUALARM SYSTEM

The Gamewell Dualarm System simultaneously calls the fire department and sounds a local exit alarm throughout the building so that occupants may leave or be assisted therefrom in an orderly manner.

Fire drills for instructing the pupils in proper procedure in case of fire may be initiated by this system. For fire drills, the local alarms only are sounded, no alarm being sent to the fire department.

GAMEWELL PROPRIETARY FIRE ALARM SYSTEMS

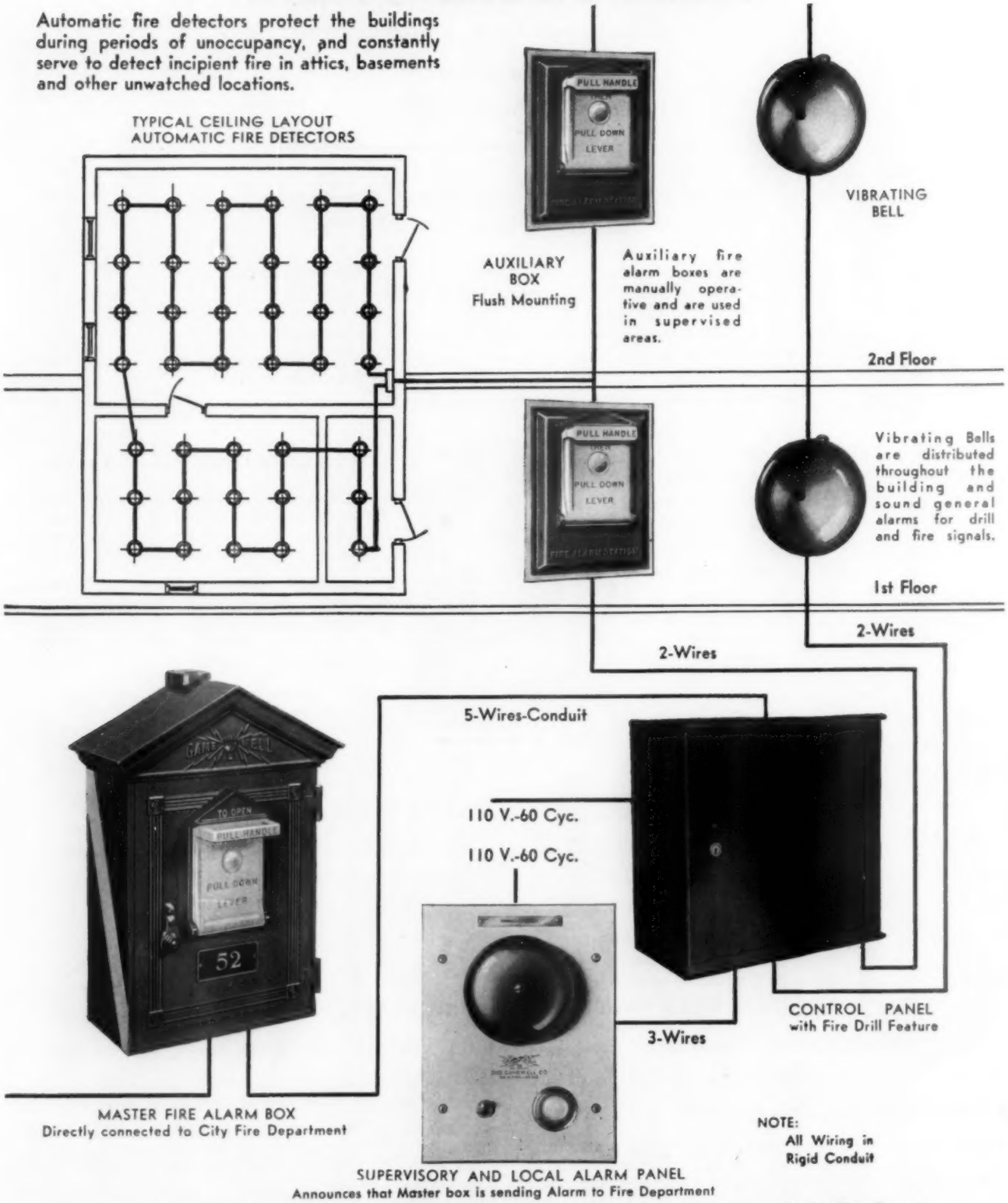
The Proprietary system includes facilities for . . . directing the local fire brigade to the scene of fire . . . calling the municipal fire department . . . automatically closing fire doors and operating water and foam deluge sets—if any—in the affected areas. . . . All as the result of the manual operation of a fire alarm box or the automatic operation of a fire detector.

Gamewell fire alarm systems are efficient, reliable, as durable as the buildings themselves, assure continuity of institutional operation and constitute a permanent investment in safety to buildings and occupants.

Write for complete descriptive catalog. Surveys and estimates freely furnished

A TYPICAL DUALARM SYSTEM

Automatic fire detectors protect the buildings during periods of unoccupancy, and constantly serve to detect incipient fire in attics, basements and other unwatched locations.



Exit Alarm Systems are identical with the above except that the Master box connection with the Fire Department is not supplied.

Spacing (1) Automatic fire detectors—generally the distance between centers should not exceed 15 feet with the first line 7½ feet from the wall. (2) Auxiliary Fire Alarm Boxes—at least one on each floor located at or near exits. (3) Vibrating Bells—sufficient in number and properly distributed to be heard distinctly in all parts of the building.

Note—Plans and specifications for systems to conform with State laws or local ordinances will be supplied on request.

Specifications

THE GAMEWELL DUALARM SYSTEM

Detailed Specifications (Typical)

NON-CODING TYPE—This system shall include devices and circuits providing for the manual and automatic initiation of alarms of fire and for the manual initiation of fire drill signals. The act of initiating an alarm of fire, whether manually or automatically performed, shall result in the transmission of a distinctive code signal to the fire department and the operation of local alarm equipment within the premises. The local alarm shall sound continuously until manually disconnected and shall be of the so-called non-coding type. The system may be arranged to sound an intermittent code indicating fire, if so desired, such as 4-4 repeated continuously irrespective of point of origin within the premises.

CODING TYPE—The coding type Dualarm system is identical in function with the non-coding type except that the manually operated auxiliary fire alarm boxes within the premises shall act to cause a distinctive code signal indicating the location of the box operated to be sounded on the local alarm equipment throughout the premises.

EQUIPMENT, NON-CODING TYPE—1 Master type fire alarm box with supervisory alarm panel; 1 Dualarm control and fire drill panel; Auxiliary fire alarm boxes for manual operation; Automatic fire detecting devices—Sprink-la-stats; 8″ Vibrating bells, 110 volt A.C., for sounding local fire alarm or drill signals.

All of this equipment shall be located as described or shown on the plans and approved by the (owner, architect, engineer, or other official).

MASTER FIRE ALARM BOX—The master box shall be of the Gamewell Three-Fold successive type, designed for inclusion in the municipal fire alarm circuit of the City of ..... and to be automatically actuated by the operation of any auxiliary fire alarm box or automatic fire detecting device connected therewith. The successive feature shall provide for the proper transmission of an alarm to the fire department even though, at the time of operation, the municipal circuit may be engaged in transmitting an alarm from another box. In such an event, the local fire alarm shall be instantly sounded and the alarm to the fire department transmitted as soon as the municipal circuit is free to receive the signal. The master box shall be so arranged that, after it has been actuated from a remote control station, it will automatically disconnect the local fire alarm circuit to prevent needless repetitions of the alarm to the fire department. The master box shall be arranged so that it may be manually operated at any time to call the fire department without causing an operation of the local alarm equipment.

SUPERVISORY PANEL—There shall be associated with the master box, a supervisory alarm panel (located wherever specified) for audibly and visibly indicating an operation of the master box to transmit an alarm. The equipment mounted on this panel shall consist of a 4″ Underdome type, 110 volt, A.C. vibrating bell, pilot lamp, and bell-silencing switch. It shall be possible to silence the bell at any time by means of the switch but the visual indication shall continue until the master box is re-set and the local fire alarm circuit restored to its normally operative condition. The panel shall consist of a 6″ x 9″ grained erado face plate mounted on a—flush or surface—type wall box. (See illustration.)

DUALARM CONTROL AND FIRE DRILL CABINET—

1. The cabinet containing the control equipment shall be of sheet steel, 16″ wide, 18″ high, and 6″ deep, finished with black crystal lacquer. (Specify whether surface or flush mounting is desired.) The cabinet shall be provided with a hinged door with brass cylinder lock and knob catch. The operating equipment shall be mounted on an ebony asbestos panel, ½″ thick, finished with dull black lacquer.

2. There shall be mounted on the panel, all necessary equipment and wiring to control the Dualarm System in conjunction with the master box and the alternating current supply for the local alarm circuit. This equipment shall include a supervisory relay connected in the A.C. circuit. The local auxiliary fire alarm circuit shall, in addition to providing a path for the direct fire alarm current, also provide a route for the supervisory alternating current which holds up the relay and thus establish double supervision. Any interruption of the auxiliary fire alarm circuit shall actuate the master box, disconnect the alternating current supply to the relay and energize the pick-up coil of a bell-ringing contactor. The contactor shall be rated at 10 amperes, intermittent operation.

3. The wiring plan shall be such that the local alarm equipment will be responsive only to an interruption of the auxiliary fire alarm circuit and in the event of such interruption, the local alarm shall continue until the auxiliary circuit has been restored to normal condition. The system shall be so arranged that should an actual fire occur while a drill signal is being sounded, the alarm may be transmitted to the fire department as a result of the operation of an auxiliary fire alarm box, an automatic fire detecting device, or of the master box itself.

4. (Drill Feature.) There shall also be mounted on the panel, suitable push buttons whereby drill signals may be initiated and terminated without causing an operation of the master box.

AUXILIARY FIRE ALARM BOXES—NON-CODED—These boxes shall each consist of a steel outlet case having mounted thereon a cast aluminum face plate. The operating mechanism shall be secured to the back of the face plate with the operating lever extending through an opening in the plate. A spring-retained pull-down door is mounted over the operating lever, a simple movement of which shall expose the lever, ready for operation. The general design and method of operation are identical to a municipal fire alarm box and proper instructions for operating shall be cast on the face plate.

Each operating mechanism shall include a metal encased mercury contact tube rated at 110 volts, 2 amperes, secured in an insulating holder of molded bakelite. The operation of the pull lever shall serve to open the auxiliary control circuit and actuate the master box. The auxiliary boxes shall be connected in series in the control circuit. When operated, the handle shall be locked in the operated position to ensure continued actuation of the contact tube and may be restored to normal position by means of a release key which shall be supplied with the system.

The face plate including the pull-down door shall be of high strength aluminum alloy and a cast aluminum trim plate shall be provided to adapt the face plate to the outlet box to compensate for any irregularity in position, and in flush type installations, to cover the plaster line. No fastening screws shall be visible from the front of the box.

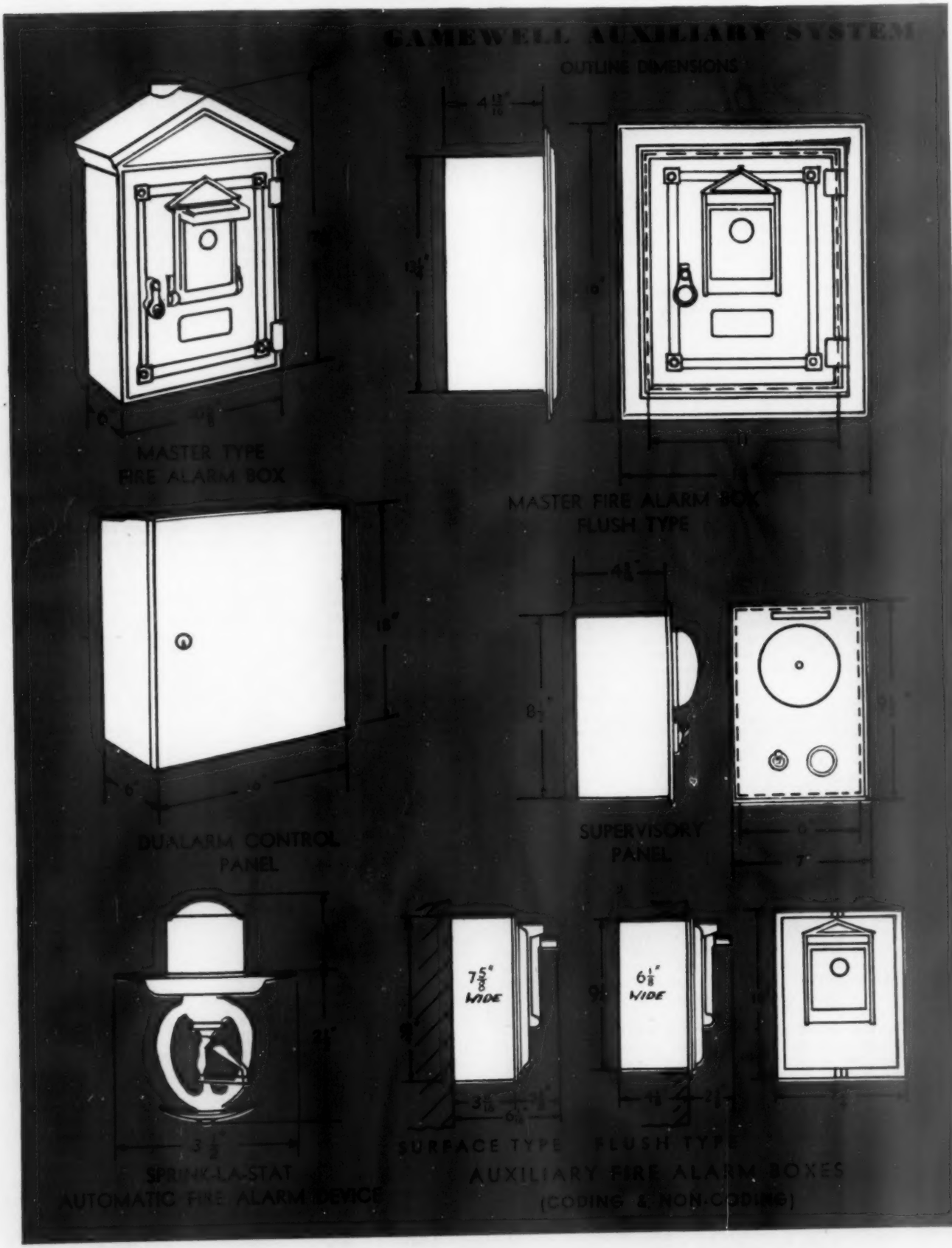
NOTE (1): *In cases where local indication on an annunciator of the auxiliary box operated is desired, add the following paragraph:*

Each box shall be provided with a local open-circuit annunciator operating contact which shall consist of a mercury tube similar to that described for the closed auxiliary circuit. In this case, a movement of the operating handle shall serve to open the auxiliary control circuit and close the local annunciator circuit, thus indicating on the annuciator the exact location of the auxiliary box operated.

NOTE (2): *The auxiliary fire alarm boxes described are designed for operation in either the shunt loop circuit requiring no local battery or other local source of energy, or in a local auxiliary circuit energized by local battery.*

AUTOMATIC FIRE DETECTORS—The automatic fire detectors shall be of the fixed temperature type SF-4R for exposed conduit—or SF-4 for flush mounting. The detectors shall be set to a temperature rating of 135° F. and the operating point on all detectors shall be within a maximum variation of ± 5° F. The stability shall be such that continued exposure at 125° F. shall not cause a detector to operate. The sensitivity shall be such that on the basis of measurements used by the Underwriters Laboratories, Inc., a minimum spacing of 15 feet from center to center will be approved. The detectors shall be capable of being tested for operation in their positions after installation and repeated tests shall not in any way affect their characteristics.

All detectors shall have their contacts and operating mech-



THE AMERICAN SCHOOL AND UNIVERSITY—1940

anisms enclosed in a hermetically sealed glass tube, protected by a guard of stamped sheet brass. The contact surfaces shall be made of platinum or of platinum-iridium alloy containing not less than 90% platinum, and 10% iridium. There shall be no exposed wire connections. Suitable binding screws for the attachment of wires without soldering shall be provided on the detector mounting. Each detector shall be completely assembled and tested ready for mounting in a suitable standard cut-out box.

NOTE: *The detectors are available in standing ratings of 135° F., 185° F., and 260° F., but may be supplied in any rating from 0° to 300° F. Stability under continued exposure is guaranteed at 10° F. below the temperature rating employed.*

VIBRATING BELLS—The bells shall be of the Underdome type in which the mechanism is entirely concealed under the bell. The mechanism shall be synchronous in operation, not of the solenoid type and shall have no sliding plunger or contacts likely to wear or stick. The case containing the mechanism shall be mounted to a separate back plate fitting a standard two-gang switch box and be held securely in position by one lock nut. There shall be a heavy duty, two-way plug on the bell and a receptacle on the back of the plate with terminals for connecting the wires. All current-carrying parts shall be thoroughly insulated from the frame and withstand a break-down test of 1800 volts alternating current. The bell proper shall be of pressed steel, 8" in diameter, black nickel finished.

(NOTE: *These bells are available in 4", 6" 8" 10" and 12" sizes.*)

EQUIPMENT—CODING TYPE—The specifications for the Gamewell Dualarm Coding System are identical with those of the non-coding type except as follows:—

Control and Fire Drill Cabinet—Change third paragraph to read: "The equipment and wiring shall be so arranged that the local alarm equipment will be responsive only to an interruption of the auxiliary fire alarm circuit, and, when such interruption is caused by the operation of a coded fire alarm box, the code number of such box indicating its exact location shall be sounded on all of the alarm bells connected with the system. The system shall be so arranged that should an actual fire occur while a drill signal is being sounded the alarm may be transmitted to the fire department as a result of the operation of an interior fire alarm box, an automatic fire detecting device, or of the master box itself."

Eliminate the fourth paragraph of the control cabinet specification and substitute the following specification for the Auxiliary fire alarm boxes.

INTERIOR FIRE ALARM BOXES—CODED (VITA-GUARD TYPE)—These fire alarm boxes shall each consist of code signal formulating mechanism securely enclosed within a sheet steel outlet case attached to a cast aluminum face plate. The operating lever shall extend through the plate and be protected by a standard fire alarm box quick action cover.

The boxes shall be of the sector pull type, normally unwound, and the act of pulling the starting lever of a box shall wind the signal formulating mechanism sufficiently to cause the transmission of four rounds or repetitions of its code number indicating its exact location. The starting lever and co-operating parts of each box shall be so arranged as to prevent any possibility of interference with or mutilation of signals by careless or malicious manipulation. The starting lever shall also be so arranged as to completely disengage itself from the signaling mechanism and not to again engage same until after the box has completed its signal.

The boxes shall be designed to operate on a normal current flow of 100 milli-amperes D.C. and to successfully perform their functions under wide variations of current strength from normal. All metallic parts connected to the circuit shall be thoroughly insulated from all other parts of the signaling mechanisms. The signaling contacts shall be made of selected materials of the best known kinds for the purpose and faced with heavy contact points of pure silver. The code wheels shall be cut on a uniform index, so that each wheel, irrespective of number, will require the same time for each revolution as all other code wheels in the system, and so that box numbers may be readily interchanged without the necessity for retiming the code signaling mechanisms.

The signaling mechanisms shall be manufactured from selected materials of the best quality for the purpose; all steel parts shall be of stainless steel and all iron parts rust-proofed by the Parkerizing process. The entire assembly shall be thoroughly finished and protected in the best known manner from corrosion and tarnish. Suitable terminals for the wires shall be provided and conveniently installed on each mechanism.

The face plate and quick-action cover over the starting lever shall be of high strength cast aluminum alloy and a cast aluminum trim plate shall be provided with each box to adapt the face plate to the outlet box to compensate for any irregularity in position, and in flush type installations to cover the plaster line. No fastening screws shall be visible from the front of the box.

GAMEWELL PROPRIETARY FIRE ALARM SYSTEMS

For institutions and properties of sufficient size to warrant the installation of complete signaling systems, each including a central operating and supervising station at the property to be protected. Such systems are under the exclusive control of the owners and are maintained, operated, and supervised by them. Provision may and should be made for the simultaneous transmission of alarms to the municipal fire department when practicable.

These systems consist of automatically supervised electrical circuits and associated instruments whereby alarms of fire may be initiated, sounded, and recorded.

ESSENTIAL CHARACTERISTICS

1. Alarms—prompt and distinctive—for assembling the local fire fighting organization at the scene of the fire.
2. For the automatic operation of water and foam deluge sets—if any in the affected area.
3. For notifying the municipal fire department if one is available, of the existence and location of fire in the institution.
4. Local—providing for the safety of the occupants and employees in the building or area affected by fire.
5. Automatically closing fire doors in the affected area.
   NOTE: *All of the foregoing operations result simultaneously from the act—manually or automatically performed—of initiating an alarm of fire.*
6. The continuation of operations in buildings or areas not affected.
7. Automatic sprinkler supervision in sprinklered buildings to the end that alarms will be instantly given for sprinkler operation by fire or accidental waterflow.
8. Drill alarms—whereby periodic drills of the local fire brigade and other employees may be held for instructive purposes. This feature is required by law in some states and the cost is negligible if included in the initial installation of a system.
9. Automatic supervision—the system is of the automatically supervised type and any accidental break in a circuit and consequent interruption of service will be instantly announced and recorded.
10. Ability to transmit alarms even though the circuit may be accidentally broken when the system is operated for fire. This feature is of vital importance as fire may have opened the circuit depended upon to announce the alarm.

ELEMENTS

1. Means for initiating alarms of fire and fire drill signals.
   a. Fire alarm boxes, each arranged to transmit a distinctive code signal indicating its exact location.
   b. Master fire alarm boxes, which may be operated from remote points by remote control stations. The master box serves to transmit an alarm indicating a building or group of buildings, or an area within a building in which fire exists. The remote control stations connected therewith save time and afford a multiplicity of points of operation at a low average cost.
   c. Remote control stations may be either manually operated or heat-actuated. The manual type, known as Auxiliary fire alarm boxes, are applicable in constantly supervised areas. Automatic heat-actuated remote control stations are applicable generally to unattended areas such as exits in warehouses, storage rooms, attics, and all points of high fire hazard.
2. Alarm equipment for announcing fire and fire drills may consist of gongs, horns, whistles, or lights, depending upon the conditions in the area within which the alarms are sounded. For general alarm purposes in institutions the Gamewell Diaphone horn operated by compressed air is recommended. If a constant supply of live steam—60 lb. pressure or more—is available, steam whistles may be used. Either means may be controlled and operated automatically by the fire alarm system. It is vitally important that the general alarm for fire be different in tone from any other horn or whistle used in or about the institution for sounding routine signals.
3. Recording equipment for automatically recording fire drill and test signals and any interruption of the circuit.
4. Battery and control equipment.
5. Electrical circuits.

A Gamewell Proprietary fire alarm system for any particular institution may include all or any combination of the functions and elements necessary to meet the requirements

SURVEYS, PLANS, AND ESTIMATES SUPPLIED ON REQUEST

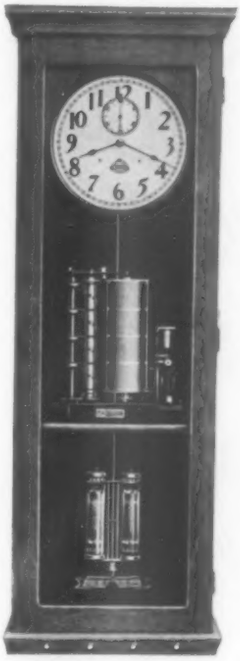
THE CINCINNATI TIME RECORDER CO.

1733-43 Central Ave. Cincinnati, Ohio

SALES AND SERVICE REPRESENTATIVES IN PRINCIPAL CITIES

CINCINNATI-LANDIS

MASTER and SECONDARY CLOCKS — PROGRAM MACHINES — PUSH BUTTON BOARDS — PROGRAM BELLS, BUZZERS, HORNS — EMPLOYEES TIME RECORDERS — TIME STAMPS — ATHLETIC TIMERS — SCOREBOARD CLOCKS FOR GYMNASIUMS, Etc. . . .



Combined Master and Program Clock 1-Minute Type Program Machine

CINCINNATI-LANDIS PROVIDES MODERN, ACCURATE SIGNALING EQUIPMENT FOR SCHOOLS AND COLLEGES

For almost a half century, Cincinnati-Landis electro-mechanical signaling equipment has provided dependable, accurate service to the schools and colleges of the nation. Systems ranging from simple two or three station installations in small schools to multi-plexed installations designed to reach every part of the large far-flung university campus, are engineered, manufactured, sold and serviced by The Cincinnati Time Recorder Company. A large staff of expert engineers is at your disposal for the purpose of analyzing your requirements and recommending a system that will best provide reliable, uninterrupted service at minimum cost.

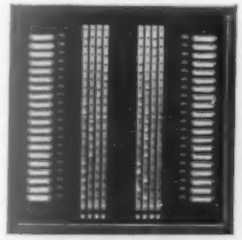
LABOR AND ATTENDANCE RECORDING EQUIPMENT

It is often desirable to record employees' time on duty in relation to school schedules and activities. A CTR TYManDATER provides an automatic Time Stamp for printing on papers and documents as well as providing an accurate printed time recording of attendance and other essential time records. The Cincinnati Time Recorder Company also manufactures a wide range of precision-built, electric time recording machines which can be hooked up in circuit and synchronized in any Cincinnati-Landis time signaling system.

Style 2M Round Metal Secondary Clock

CINCINNATI-LANDIS IS DEPENDABLE

All CINCINNATI-LANDIS Signaling systems and other CTR products are built to endure—are comparatively simple to operate and economical to install and maintain. Thousands of the nation's schools, colleges and institutions are completely equipped with CTR Time Recorders and Cincinnati-Landis Signaling systems, both as original installations and as replacement for obsolete, outmoded equipment.



Push Button and Cross-Connecting Board

Style 3S Square Wood Secondary Clock

Engineered, Manufactured, Sold, Serviced and Guaranteed by

THE CINCINNATI TIME RECORDER COMPANY

1733-43 CENTRAL AVENUE CINCINNATI, OHIO

Complete information on any one or more of the above products as well as other CTR equipment will be sent on request. Consult CTR without obligation regarding your timekeeping, time signaling and time recording problems

"TYManDATER," an All-Purpose Time Stamp

THE HOLTZER-CABOT ELECTRIC CO.

Pioneers in School Signaling Equipment

125 Amory Street, Boston, Massachusetts

---

1 Responsibility for your SCHOOL SIGNAL SYSTEMS

ONE RESPONSIBILITY . . .

for Program Bells, Fire Alarm, Clocks, Sound Distribution, and Telephones from **one manufacturer,** can give but **one result**—complete satisfaction at lowest investment.

ONE COORDINATED SYSTEM . . .

permits economies impossible with unrelated components. By planning ahead NOW you can realize these economies as you add additional signal services to your school. Holtzer-Cabot's **one** interest is to meet your signal needs completely and economically. A consultation with a Holtzer-Cabot Field Engineer near you will aid you in your planning.

RESPONSIBILITY

for warning your pupils of fire means responsibility for their safety and lives. Holtzer-Cabot Fire Alarm Systems never shirk **their** responsibilities . . . nor **yours!**

RESPONSIBILITY

for your entire school routine may be placed with confidence in Holtzer-Cabot Bells, Control Panels and Program Machines.

RESPONSIBILITY

for accurate time-keeping lies in the hidden portions of your Clock System. Holtzer-Cabot Clock Systems are time-tested . . . time proven.

RESPONSIBILITY

for building good citizens is placed in the schools. Holtzer-Cabot Centralized Radio will keep your students informed on the important events of the world.

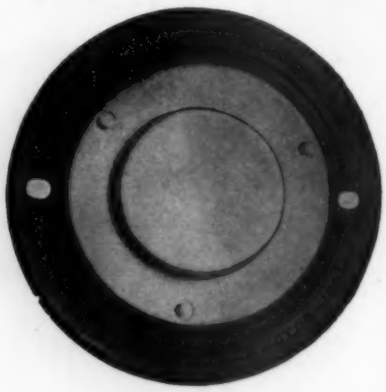
ONE COORDINATED SYSTEM . . .

centralizes individual responsibilities . . . One manufacturer can tastefully combine the signaling equipment into one convenient centralized control unit. Let our engineers advise you on your complete signal problem.

The Holtzer-Cabot Electric Co.

125 Amory Street

Boston, Massachusetts



FIRE EYES NEVER SLEEP

They are constantly on the job to protect lives and property. They automatically give an alarm at the start of fire. They guard your investment against loss of property—life—and time. Remember—insurance cannot replace pupils—**know** they are protected. Safeguard them at all times by installing Holtzer-Cabot Fire Eyes.

FIRE EYES give complete fire protection by detecting a **slow, smouldering fire—or a quick blaze.** They sound an alarm whenever the temperature rises to a danger point . . . and they respond when the temperature rises rapidly. Warning of incipient fire is instantly given **without causing a water loss.**

Write for literature and detailed information

The Holtzer-Cabot Electric Co.

125 Amory Street, Boston, Massachusetts

BRANCHES IN ALL PRINCIPAL CITIES

THE WARREN TELECHRON COMPANY

Manufacturers of *Telechron** Timekeeping Systems for Modern Schools

General Office and Factory — Ashland, Mass.

SALIENT FEATURES OF TELECHRON TIMEKEEPING SYSTEMS

I. Quiet operation.

II. No local master clock required.

III. Operate direct from the regulated alternating current.

IV. Available for 115 volt or 24 volt operation.

V. Each timekeeper equipped with self-starting, sealed in oil, synchronous motor.

VI. No oiling, cleaning, winding or regulating.

VII. Available for individual installation or as part of a Telechron centrally controlled system.

VIII. Clocks available with sweep second hands.

IX. Clock hands move continuously around the dial.

X. National Board of Fire Underwriters' approved type construction throughout.

Your Architect has SWEET'S ARCHITECTURAL CATALOG Giving Complete Specifications

CLASSROOM CLOCK

CLASSROOM CLOCK

CLASSROOM BUZZER

CORRIDOR BELL

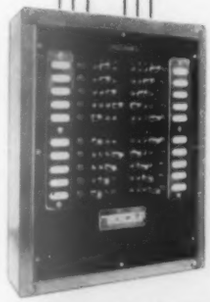
YARD GONG

Typical Telechron MDMR (Manual Dual Motor Reset) System for a school, with signals and control board

CENTRAL CONTROL

PROGRAM INSTRUMENT

SIGNAL SUPPLY



SIGNAL CONTROL BOARD

TO AC SUPPLY

* *Telechron is the trade-mark, registered in U. S. Patent Office, of Warren Telechron Company.*

INTERNATIONAL BUSINESS MACHINES CORP.

INTERNATIONAL TIME RECORDING DIVISION

Manufacturers of Electric Time, Signal Program, Telephone, Fire Alarm and Central Control Sound Systems

WORLD HEADQUARTERS BUILDING

590 Madison Avenue, New York, N. Y.

CANADIAN DIVISION: 300 Campbell Avenue, TORONTO, ONTARIO

BRANCH OFFICES AND SERVICE STATIONS IN THE FOLLOWING CITIES

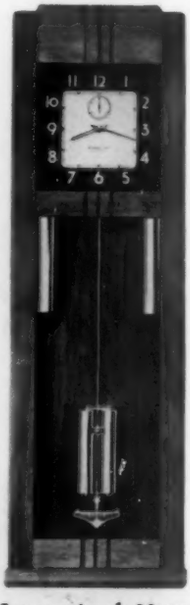
Akron, Ohio
Albany, N. Y.
Atlanta, Ga.
Baltimore, Md.
Birmingham, Ala.
Boston, Mass.
Buffalo, N. Y.
Chattanooga, Tenn.
Chicago, Ill.
Cincinnati, Ohio
Cleveland, Ohio
Columbia, S. C.
Columbus, Ohio
Dallas, Tex.
Dayton, Ohio
Denver, Colo.
Des Moines, Iowa
Detroit, Mich.
El Paso, Tex.
Endicott, N. Y.
Erie, Pa.
Evansville, Ind.
Flint, Mich.
Grand Rapids, Mich.
Harrisburg, Pa.
Hartford, Conn.
Houston, Tex.
Huntington, W. Va.
Indianapolis, Ind.
Jackson, Miss.
Jacksonville, Fla.
Jersey City, N. J.
Kansas City, Mo.
Los Angeles, Calif.
Louisville, Ky.
Memphis, Tenn.
Milwaukee, Wis.
Minneapolis, Minn.
Newark, N. J.
New Orleans, La.
New York, N. Y.
Oakland, Calif.
Oklahoma City, Okla.
Omaha, Neb.
Oshkosh, Wis.
Peoria, Ill.
Philadelphia, Pa.
Pittsburgh, Pa.
Portland, Me.
Portland, Ore.
Providence, R. I.
Reading, Pa.
Richmond, Va.
Roanoke, Va.
Rochester, N. Y.
Rockford, Ill.
St. Louis, Mo.
Salt Lake City, Utah
San Antonio, Tex.
San Francisco, Calif.
Scranton, Pa.
Seattle, Wash.
Shreveport, La.
South Bend, Ind.
Spokane, Wash.
Springfield, Mass.
Syracuse, N. Y.
Toledo, Ohio
Tulsa, Okla.
Washington, D. C.
Wheeling, W. Va.
Wichita, Kan.
Winston-Salem, N. C.
Youngstown, Ohio

ELECTRIC TIME AND PROGRAM EQUIPMENT

Metal Case Secondary Clock

Marble Dial Secondary Clock

International manufactures hundreds of different types of time recording, indicating and signaling devices. Most of these are furnished for operation individually or as secondary units in a master clock controlled system. In the latter case, any building or group of buildings is furnished with completely automatic and dependable electric time service. Attendance time recorders, job time recorders, wall clocks and time stamps operate in exact unison.



International Master Clock with Mercurial Pendulum

This Clock System, of the electric impulse type, features automatic, electric regulation. Once each hours all units are simultaneously supervised. That is, they are checked or aligned for continuous agreement with their master time source. Practically all maintenance is thus eliminated. This system ordinarily operates from the commercial lighting circuit, but battery operation is furnished when necessary.

A Typical Tower Clock Built to Meet the Architect's Special Requirements

Program equipment, operated as part of the International Self-regulating Electric Time Systems, makes it impossible for clocks or bells to contradict each other. Through its use, classes are moved, work periods are designated or phases of process work are marked by audible signals—exactly as scheduled.

All International equipment is furnished according to architects' specifications—designs, styles, etc., to meet individual requirements, architectural or decorative schemes. Consult representatives for full details.

The International Metal Disc Program Signaling Unit

FIRE ALARM EQUIPMENT

Fire Alarm Gong

Fire Alarm Control Panel

Break Glass Station

International Fire Alarm Systems offer the most up-to-date equipment for the protection of property and life. Only the latest engineering features and approved circuits are included in each installation. Expert workmanship and rugged construction assure highest quality at minimum cost. Systems for any requirement built to specification.

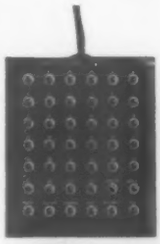
All International equipment, including Fire Alarm Systems, has been approved by the National Board of Fire Underwriters.

Data sheets are available in all International offices covering the complete range of equipment from the simplest non-code to the most elaborately supervised and coded systems. To meet every individual need, a wide variety of bells, horns, sirens and other alarm sounding devices has been provided.

INTER-ROOM TELEPHONE SYSTEMS

Cradle Type & Telephone

International Telephone Systems are specially designed only for interior communication in schools, business organizations, apartment houses, residences, etc. Several types are available to meet specified requirements.



Telephone Push-Button Mat

All equipment is specially designed for the greatest convenience, ruggedly constructed to furnish the highest quality service at minimum cost. Operation of all types is extremely simple. Either direct or alternating current may be employed as desired. Many types of telephone instruments in both pedestal and wall models are available.

Flush Wall Telephone

CENTRAL CONTROL RADIO, MUSIC AND SPEECH SYSTEMS

Surface Wall Type Sound Reproducer

For those places where sound must be amplified to reach large audiences and for institutions where it is desirable to distribute sound programs simultaneously throughout a number of different rooms in any one or more buildings, International provides an unusual Central Control Radio, Music and Speech System. It permits the flexible use of radio, phonograph or microphone programs through one instrument that is as simple to operate as the ordinary home type radio.

Single-Channel Sound Control Cabinet

A unit plan of construction is employed to permit purchase in sections. As the demand grows or as funds become available, extra sections may be added. Such additions do not make the original equipment obsolete, nor take up extra floor space.

The loudspeakers, which assure faithful, life-like reproduction, are provided in a wide range of models including both permanent field and dynamic types to meet every possible acoustic or decorative requirement. Directional horn speakers are provided for athletic fields and other outdoor uses.

Sound Reproducer and Clock Combined in One Unit

SPECIFICATION-WRITING SERVICE

In every International office there is some one qualified to give expert help in the writing of specifications for the various types of low tension equipment listed on these two pages. An International representative will also be able to give valuable assistance in selecting the kind of equipment most suitable for each job. This service is yours, merely for the asking.

The International line includes almost every kind of time and sound distribution equipment. In addition to the systems listed here there are many specialties and accessory devices, such as paging systems, watchman's clocks, recording doorlocks, chimes, etc.

Complete information is available at any of the offices of **International Business Machines Corporation** listed on the preceding page.

MONTGOMERY TIME SYSTEMS

Low Cost, Quality Program Systems

Owensville, Indiana

DEPENDABLE, precision-built program systems for small schools, high schools, colleges, industrial plants and public buildings. Designed and equipped for economical installation and simplicity of operation. Built to give long and dependable service, to keep time accurately and to fit handsomely into any office or school room.

Montgomery Time Systems (formerly manufactured by the Hansen Co.) have been giving satisfactory service in hundreds of schools for more than twenty-five years. The line includes program systems to operate from 1 to 30 bells or signals on as many as five different time programs. Either synchronous electric or 8-day pendulum movements are available.

MONTGOMERY MODEL SM-3 AND B-3

The Montgomery model illustrated below is the most popular and practical for most schools and colleges. Its time movement is an improvement of the same clock that is giving more than 20 years of trouble-free service in many installations. The program mechanism is as permanent, as simple and sturdy as any you can buy.

(1) Time Movement—Made in the company's own factory . . . designed and built for program clock service. Not an "adapted" cheaper, less dependable movement. Electric clocks have genuine Hansen self-starting motors.

(2) Easy to Install—Montgomery clocks are wired and equipped for easy installation. They are sold complete with all necessary accessories except signals and wiring leading from the clock case. Each system has a bell-ringing transformer, one relay, pushbutton, manual switch and fuse for each circuit.

(3) Oak Case—The hand-rubbed lacquered oak case is finished in medium golden oak. Special cases and finishes can be supplied on special order. Cases have door lock with key.

(4) Disk Type Program Mechanism — The simple, sturdy program system is easy to set or change. There is nothing to tear or break.

(5) Automatic Calendar Switch—An automatic switch silences bells at night and over week ends. Push-buttons are mounted on the side of the case for operating signals independently of operating mechanism.

THE *NEW* MONTGOMERY MEMO

The new **Memo** is built to fill the needs of small schools, public buildings and industrial plants requiring only one program circuit of bells. Its price brings program equipment within the reach of thousands of institutions where signals are now hand-controlled. It has the same type movement and the same rugged program system as the larger Montgomery models. The **Memo** will control as many as 10 or more signals and ring them at 2½ or 5 minute intervals through a 12 or 24 hour period.

It comes equipped with pushbutton and manual switch. Your local electrician can quickly connect it to your present bell or buzzer wiring, or install it completely in a few hours. If you have been doing without a program system because of expected high cost, it will pay you to investigate the **Memo**.

All-Metal, Fool Proof Program System—In Montgomery Program Clocks, small metal clips attached to slotted metal disks control the ringing of signals. Slots in each disk are clearly marked with the corresponding time and to change the time for sounding, simply remove the clip from one slot and insert it into the proper one. There is no paper tape to tear, no chain to break . . . no chance for ringing of bells at the wrong time. Any number of signals—from 1 to 30—can be set to sound at 2½-minute intervals through a 12-hour period. Machines for 24-hour schedules can be furnished.

WRITE FOR RECOMMENDATIONS AND ESTIMATE FOR YOUR SCHOOL

Descriptive literature, prices of systems and forms for returning information about your particular problems will be mailed on request. Prices of Montgomery Systems are held down by low selling costs

Salesman will not call unless you request it

MONTGOMERY TIME SYSTEMS
OWENSVILLE, INDIANA

THE ELECTRIC STORAGE BATTERY COMPANY

World's Largest Manufacturers of Storage Batteries for Every Purpose

Allegheny Avenue and Nineteenth Street, Philadelphia, Pa.

Atlanta, Ga., 210 Walker St., S. W.
Boston, Mass., 100 Ashford St.
Chicago, Ill., 4613 So. Western Blvd.
Cincinnati, Ohio, 718-19 Temple Bar Bldg.
Cleveland, Ohio, 6400 Hermann Ave., N. W.
Denver, Colo., 810 14th St.
Detroit, Mich., 8051 W. Chicago Blvd.
Kansas City, Mo., 129 Belmont Blvd.
Los Angeles, 1043 S. Grand Ave.
Minneapolis, Minn., 617 Washington Ave., N.
New Orleans, 428 Balter Bldg.
New York, N. Y., 23-31 W. 43rd St.
Philadelphia, Allegheny Ave., and 19th St.
Pittsburgh, Pa., Union Trust Bldg.
St. Louis, Mo., 1218 Olive St.
San Francisco, Cal., 6150 Third St.
Seattle, Wash., 1919 Smith Tower Bldg.
Washington, D. C., 1819 L St., N. W.

In Canada, Exide Batteries of Canada, Ltd., 153 Dufferin St., Toronto, Ont.

Protection Against Dangers of Sudden Lighting Failure

Lighting Failures Do Happen—Storms, fires, street accidents, floods, blown fuses, short circuits—all events which electric companies are helpless to foresee or prevent—do cause electric lighting interruptions.

No Community or Building Immune—Electric service interruptions occur without warning, when least expected and where least wanted. An auditorium or gymnasium crowded with pupils at sports, plays, lectures or dances, is no place to gamble with the risks of injury or damage which frequently follow the sudden darkness of a lighting failure.

Danger Unnecessary—Today, emergency lighting can be provided for the vital parts of any school building by installing Exide Keepalite. During an electric service interruption, Exide Keepalite furnishes the power from a dependable Exide Battery to the lights in auditoriums, gymnasiums, corridors, exits, fire towers, stairways, engine rooms, locker rooms, swimming pools, dormitories, laboratories, etc.

Automatic Protection—Exide Keepalite Emergency Lighting Battery Systems are completely automatic and instantaneous in operation. Electrical engineers agree that a storage battery, properly maintained, constitutes the most dependable source of emergency power. Automatic control equipment is provided for recharging the battery after an emergency discharge; and, low rate charging equipment provides the current needed to keep the battery fully charged at all times. The only maintenance required by Exide Keepalite Systems is the addition of a little water to battery cells three or four times a year. Exide Keepalite Systems assure this form of protection at a maintenance cost as low as 1½¢ a day for power.

Exide Batteries haev been used in emergency service, by telephone, railroad and public utility companies since 1895. The new Exide Keepalite control equipment, which automatically keeps the battery properly maintained, represents the qualifications found desirable from the experience of more than 2000 installations in all kinds of buildings.

For Any Size Installation—In order to economically meet the widely varying requirements of individual school buildings, 115 volt and 12 volt Exide Keepalite Systems are available. The important electrical circuits of entire buildings can be protected with the larger 115 volt systems; or, parts of buildings can be adequately safeguarded with the specially designed low voltage Exide Keepalite Systems. Depending upon the amount of protection desired, Exide Keepalite Systems can be had for $150.00 and up.

Superiority of Storage Battery Emergency Lighting Systems—Exide Batteries have long been used in not only emergency lighting service but also emergency power service. They safeguard the operation of railroad switches and signals, fire alarms, telephone, marine radio, industrial processes, etc.

Battery Life—Exide Batteries have long been noted for their exceptionally long life. In many industrial emergency power installations Exides have faithfully served more than 10 years. In some instances as many as 25 years' satisfactory service has been provided by Exides.

THE ELECTRIC STORAGE BATTERY COMPANY offers the services of its trained Engineering Department to assist architects in the planning of a trouble-free Emergency Lighting System. We will be glad to send you complete descriptive literature and specifications for every type of Exide Keepalite Emergency Lighting Battery System.

Exide
Keepalite
EMERGENCY LIGHTING BATTERY SYSTEMS

A Typical Exide Keepalite System with a 60-cell Exide Battery and a 30 Amp. Control Unit. It Operates Instantly and Automatically. The Infrequent Addition of Water to the Battery Is the Only Maintenance Required

This $150.00 Exide Keepalite Protects Lighting of Areas Up to 10,000 Sq. Ft. It Operates Instantly and Automatically

DEPENDABLE EXIDE LABORATORY BATTERIES AVAILABLE IN ANY SIZE, SEE PAGE 522

ROCKWOOD SPRINKLER COMPANY

Specialists in Fire Protection

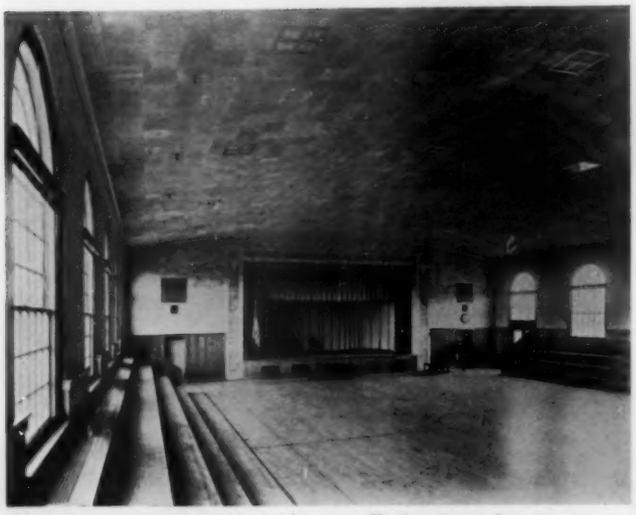
46 Harlow St., Worcester, Massachusetts

BRANCH OFFICES

ATLANTA, GA. BOSTON, MASS. BUFFALO, N. Y. CHARLOTTE, N. C. CHICAGO, ILL. CINCINNATI, OHIO DETROIT, MICH. GRAND RAPIDS, MICH. INDIANAPOLIS, IND. MEMPHIS, TENN. MILWAUKEE, WISC. MINNEAPOLIS, MINN. NEW ORLEANS, LA. NEW YORK, N. Y. NEWARK, N. J. PHILADELPHIA, PA. SAN FRANSCISCO, CAL. ST. LOUIS, MO.

In Canada: WORCESTER FIRE EXTINGUISHER CO., LTD., Montreal; Toronto

SPRINKLER SYSTEMS FOR FIRE PROTECTION



Inconspicuous type of sprinkler installation in auditorium-gymnasium of new Abington (Mass.) High School. Rockwood installed this sprinkler system while building was being built to replace former unsprinklered building destroyed by fire

Library of Fessenden School, West Newton, Mass., protected by Rockwood Sprinklers. Observe how ceilings have been kept entirely clear by placing sprinklers and piping behind beams. No piping whatever is visible to person entering room

Automatic Sprinkler Systems provide the most effective fire protection, for lives and property, that can be installed in any school or college building old or new.

Not a single occupant's life has ever been lost from fire in a school building equipped with automatic sprinklers.

Carefully compiled records of the National Fire Protection Association show that sprinklers have extinguished or held the flames in check in 96.3% of the 62,182 fires in sprinklered buildings reported during the past 42 years. Thousands of additional fires in sprinklered properties were extinguished by sprinklers with so little damage that they were never reported.

***Sidewall* Sprinkler Head installed in the dormitory of a prominent private school. This type of sprinkler is installed along walls or beams to keep ceiling free from piping. Furnished in attractive modern and antique finishes**

AREAS THAT NEED SPRINKLERS TO PROTECT STUDENTS' LIVES

The spot that needs fire protection most in every school is the basement—the location at which most fires occur. A fire in a basement is doubly hazardous because from this point flames, smoke and fumes travel upward with great speed and cut off the regular exits through which students would travel in escaping from the building.

Students' lives, the men and women of tomorrow upon whom our future as a nation depends, should also be protected by sprinklers installed in other parts of school buildings which have bad fire records such as laboratories, manual training rooms, domestic science rooms and storage rooms. Stairways, corridors and other areas in line of exits are vital spots where sprinklers are needed badly.

Sprinklers Needed On All Floors to Protect Building and Equipment

Sprinklers installed in the foregoing sections protect the lives of students and other occupants. But, sprinklers should also be installed thruout the rest of the building if you want to protect your investment in the building and equipment. Every school has much that cannot be replaced at any cost—buildings that have sentimental values, important alumni and student records, valuable books, paintings, scientific records and equipment, museum collections, trophies, etc. Sprinklers will safeguard all of these against fire.

SPRINKLERS REDUCE INSURANCE RATES WILL PAY YOU ANNUAL DIVIDENDS OF 7% TO 10%

Sprinklers represent an excellent investment for an educational institution from a financial standpoint. In most cases a sprinkler installation will pay for itself

Hardly noticeable are these sprinklers installed by Rockwood in an attractive room of an existing building—Park Manor, Babson Institute, Wellesley, Mass.

Here is another fine example of how Rockwood engineering makes it possible to adequately protect an existing school building with sprinklers and not detract from its attractive interior. Note the Sidewall Sprinklers located along the beams in this room at Tabor Academy, Marion, Mass.

within twenty years at the most. Often they will pay for themselves even sooner. Insurance companies have found from years of practical experience that sprinklers reduce the fire hazard to such an extent that they grant reductions in insurance rates ranging between 50% and 80%. And, you continue to earn these savings year after year thruout the life of your building because a sprinkler system that is well engineered and installed will last as long as your building.

Considering a sprinkler system on a purely financial basis, such an installation will usually return you dividends of 7% to 10% each year. In contrast, right now you cannot earn more than 4% average return on any of your endowment funds invested under present-day conditions.

TYPICAL ROCKWOOD SPRINKLER INSTALLATIONS IN EDUCATIONAL PROPERTIES

Wellesley College	Babson Institute
Tabor Academy	Allegheny College
Fessenden School	Alfred University
Regis College	Dean Academy

Inconspicuous Rockwood Sprinkler Installations for Attractive Educational Buildings

Modern sprinkler systems properly installed will not detract from attractive interiors. Rockwood engineers have perfected both apparatus and installation methods which make it possible for us to install sprinkler systems inconspicuously in your attractive buildings. This is true whether the sprinklers are installed in an existing building or in a new building while under construction.

Our systems are carefully engineered first to safeguard the lives of the occupants and the permanence of the building itself against fire. Particular care is then taken to make the sprinkler installation as inconspicuous as possible by concealing piping and blending fittings and sprinkler heads with the interior decorative scheme. Frequently, we install sprinklers while schools are in session without interruption to classes or other educational activities.

This requires special engineering skill which contrasts sharply with the ordinary run of engineering required in making the so-called "factory" type of installation. Our trained engineers located in the branch offices listed on opposite page will be glad to survey your property, provide you with an estimate covering the cost of a modern inconspicuous sprinkler installation and inform you how much such an installation will reduce your insurance rates. This service is supplied without cost or obligation to you. Write, wire or telephone our nearest office.

You Can Install Sprinklers Without a Substantial Cash Outlay

Sprinkler installations can be made without any substantial outlay of cash. We have a special finance plan for educational institutions. Frequently, we spread the payment over a much longer period than would be practical with a factory because of the permanence of educational institutions. We finance these installations ourselves on a moderate basis.

Savings in insurance usually pay a large part or all of the sprinkler payments. Thus, at the end of a period of years you have paid no more for sprinklers and insurance combined than you would have paid for insurance alone. In the meantime you have protected the lives of your pupils and the property which might not be replaceable, without any extra expense. For complete details send for our booklet "Dead Insurance Dollars".

THE KINNEAR MANUFACTURING CO.

2240–2260 Fields Avenue
Columbus, Ohio

Manufacturers Exclusively of Rolling Doors and Grilles

•

METAL ROLLING GRILLES

•

AUTOMATIC FIRE DOORS and SHUTTERS

•

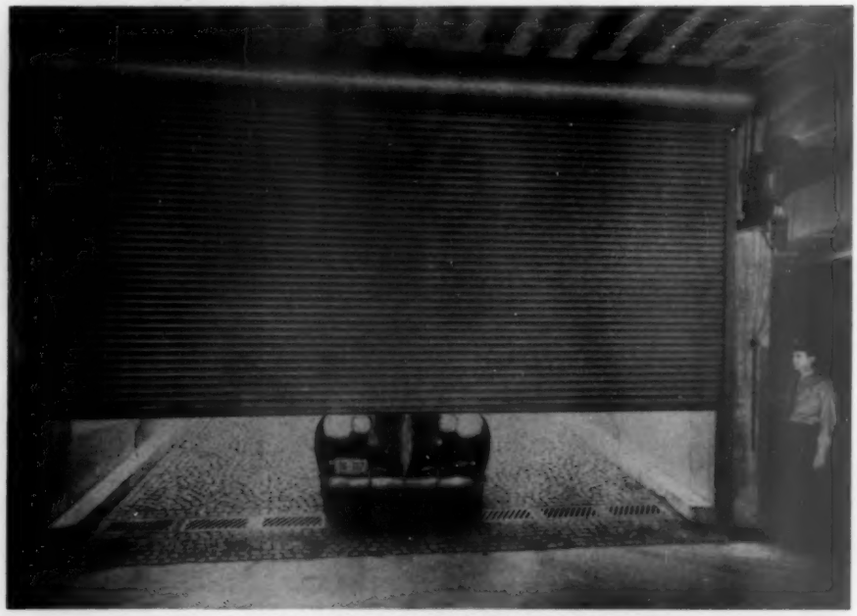
STEEL ROLLING SERVICE DOORS

•

WOOD ROLLING PARTITIONS

•

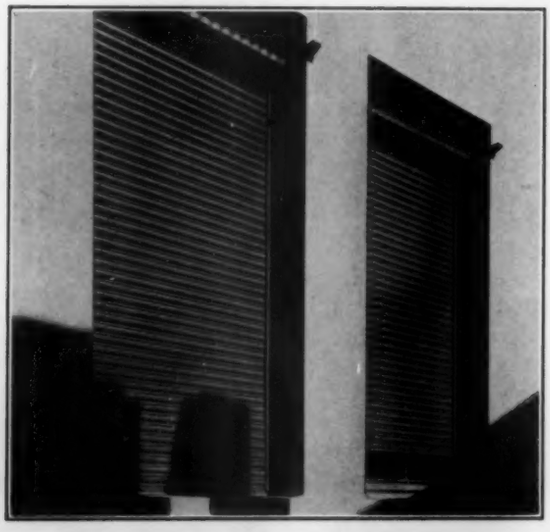
SECTIONAL UPWARD ACTING DOORS



Kinnear Motor Operated Steel Rolling Service Door

THE KINNEAR MANUFACTURING CO. pioneered and have devoted their entire effort for the past 43 years to rolling or **Upward-Acting** type Doors and Grilles. They have established the reputation throughout the world as specialists in doors that save floor and wall space, operate more conveniently, reduce maintenance expense through unusual durability and that can be built for old or new buildings for inside or outside use. Composed of a flexible metal curtain or grille which coils above the lintel, similar to a window shade, they can be installed either on the face of the wall or between the jambs when concealment of mechanism is desired. Springs provide perfect counterbalance. They can also be operated manually, mechanically or electrically.

Kinnear Automatic Fire Window Shutter



Kinnear Doors come in two distinct classifications, Service and Fire. For the latter case, though suitable for service purposes, they are "labeled" and equipped with mechanism for automatic closure in case of fire. In either case the interlocking steel slat curtain travels in heavy angle iron grooves or jamb guides and coils on a barrel placed above the lintel. Accurately tested torsion springs in the barrel provide counterbalance. Liberal use of bearings also insures easy, smooth and convenient operation.

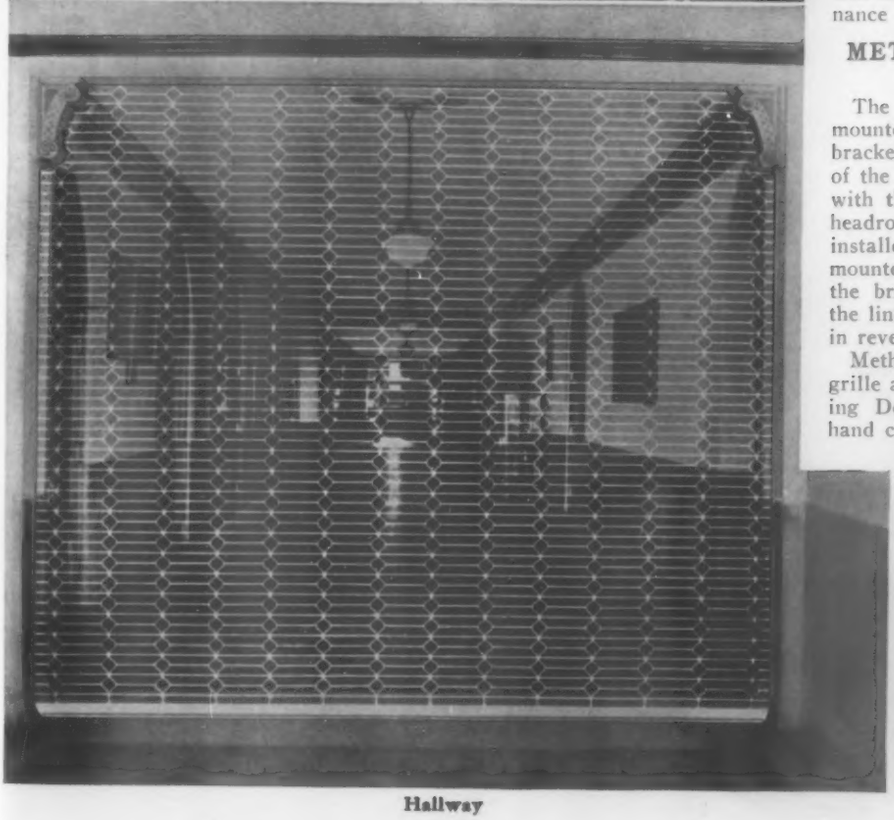
With a nation-wide organization and the finest door manufacturing facilities Kinnear can handle any of your opening requirements with equipment that costs less to operate and maintain. Ask for a Kinnear recommendation.

BRANCH OFFICES

Boston	New Orleans	Detroit
New York	Pittsburgh	Chicago
Philadelphia	Cleveland	San Francisco
Washington	Cincinnati	Baltimore

AGENTS IN ALL PRINCIPAL CITIES

KINNEAR ROLLING DOORS



Hallway

KINNEAR METAL ROLLING GRILLES

Nothing in the category of protection so completely combines all the principles of efficient, reliable and attractive design essential in planning up-to-date buildings of every class, as the Kinnear Rolling Grille. When down, providing protection, it admits air and light, and does not obstruct vision, making it particularly applicable to all types of interior and exterior openings as well as hallways in school buildings. Operating on the same principle as the Steel Rolling Door, described on opposite page, the Kinnear Rolling Grille is a permanently installed and attractively designed barrier that is remarkably strong when closed and locked, but out of sight when opened. Coiling above the opening and perfectly spring counterbalanced, it saves floor and wall space and can be raised or lowered rapidly and easily.

CONSTRUCTION

Built of various metals and attractively designed, the Kinnear Rolling Grille will harmonize with any style architecture. The grille proper is of remarkable strength and artistically designed of 5/16 in. round steel bars spaced close enough to prevent the admittance of large projectiles or a man's hand. For locking in closed position a lock is furnished.

Construction in other respects is similar to the Kinnear Rolling Door.

The Rolling Grille is ruggedly built throughout, of the finest materials obtainable. Every part is designed to give maximum wear. It is a protective device that will last a lifetime with a negligible maintenance cost.

METHODS OF INSTALLATION AND OPERATION

The Kinnear Rolling Grille may be mounted on the face of the wall with brackets and coils entirely above the bottom of the lintel and with edges of guides flush with the face of opening jambs; or where headroom is limited and grille cannot be installed on the face of the wall it may be mounted in the opening. In this latter case, the brackets and coil are mounted under the lintel with brackets and guides mounted in reveals in the wall.

Methods of operation available for the grille are likewise similar to the Steel Rolling Door, namely manual, mechanical by hand chain or crank and motor.

Gym

CORNELL IRON WORKS, INC.

ESTABLISHED
Since 1828

36th Avenue and 13th Street, Long Island City, N. Y.

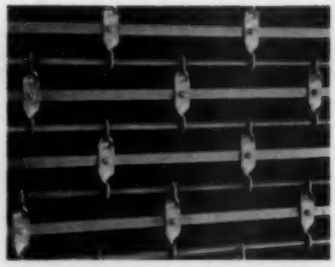
Telephone:
STillwell 4-3880-1-2-3

102 REPRESENTATIVES IN PRINCIPAL CITIES

PRODUCTS

ROLLING GRILLES and GATES, in steel or other metals; SLIDING GRILLES in steel or other metals; ROLLING DOORS and SHUTTERS in steel and other metals or with non-corroding curtain bottoms; Underwriters labeled rolling STEEL FIRE DOORS; complete line of UPWARD ACTING DOORS in wood or metal.

Makers of fine doors for over one hundred and ten years. CORNELL IRON WORKS, Inc., owes its origin to George Cornell, who purchased his employer's metal business July 29th, 1828, in New York City.



Close-up view of rolling grille curtain, CORNELL Standard BUTTERFLY TYPE

Three Cornell Rolling Grilles separating locker rooms from Gymnasium; Castlemont High School, Oakland, California

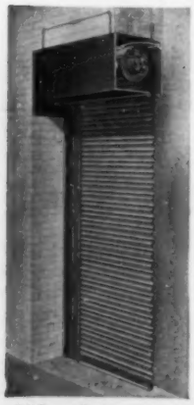
ROLLING DOORS AND ROLLING GRILLES

The doors proper are made up of interlocking metal slats running in vertical metal side guides, flexible to coil. All-steel curtains are hot galvanized.

Rolling Fire Doors are labeled by Underwriters' Laboratories, Inc., for fire walls, etc.

Cornell Iron Works, Inc., are the originators of the Rolling Grille in America. Cornell Rolling Grilles operate like rolling doors, but they do not block light, air or vision. They have been widely accepted for school corridors, etc. Can be completely concealed when open. Rolling Grilles are made of 5/16" round hard drawn galvanized steel bars running continuous horizontally from jamb to jamb and locked into rolled steel vertical side guides. The horizontal bars are flexibly connected by unbreakable vertical certified malleable iron or steel links; permitting entire grille to coil overhead.

Patented Locking Device; Bars throw to both sides and engage holes in backs of side guides. Padlock or cylinder lock can be furnished, workable from either side.



(Above)

Labeled Rolling Steel Fire Door, coiling under lintel in the opening between the jambs. Shown in section.

Note the overhead counterbalancing shaft, used both in rolling doors and rolling grilles; and the enclosing hood. Side guides may be concealed in the wall and the overhead coil hidden in the ceiling.

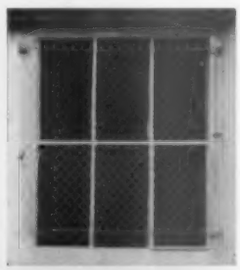
CORNELL *SLIDING* GRILLES

Cornell Sliding Grilles give high protection at exceptionally low cost. It is a patented steel curtain of heaviest galvanized chain link factory fence, extended to any height of opening by galvanized rods running to track above. The grilles can be used anywhere to keep out intruders and allow free circulation of air. The construction makes it possible to nest the sliding Grilles at the side of an opening in a space only 1/6 of the opening width. Grille will travel around a curve, and lie at a right angle to opening if there is 10" room available from edge of jamb.

Cornell Sliding Grilles are recommended for school corridors, as a low priced substitute for Rolling Grilles; for auditoriums and stages; for gymnasium and court windows, entrances, gates or partitions; and for athletic and parking areas.

SEND FOR INFORMATION

A list of schools using Cornell Doors and Grilles, and folders, will be sent upon request. Our engineering department will gladly figure your requirements.



***Right*—Close-ups of Sliding Grille**

Two views of Sliding Grille protecting court window of school, open and closed

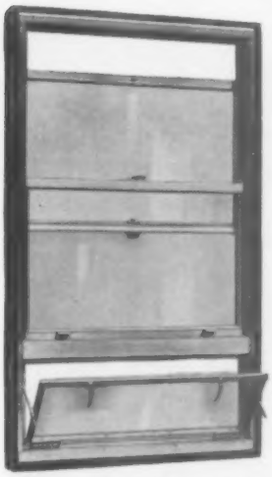
NATIONAL CASH REGISTER BUILDING, NEW YORK WORLD'S FAIR. 4 pairs of Cornell Sliding Grilles meeting in center, latching together and bolting to floor, locked with padlock. Note at right how grilles are concealed by narrow door

GENERAL BRONZE CORPORATION

34-19 Tenth Street Long Island City, N. Y.

WINDOWS · REVOLVING DOORS · ARCHITECTURAL METAL WORK · TABLETS

in Bronze, Aluminum, Stainless Steel, Nickel Silver



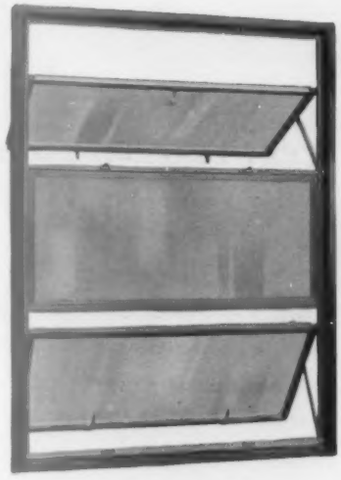
Standard Double Hung Window with Bottom Hopper

"WINDOWS BY GENERAL BRONZE"—in bronze or aluminum—can be your specification for any type of installation in schools and colleges. Whether you prefer the general utility of the double hung window, the beauty and grace of the casement window or any of the specialized types of projected windows.

No rusting, no painting, no upkeep
—will not wear out; require no replacements; do not leak air; reduce fuel and air-conditioning bills; eliminate drafts and cold spots—no felt or rubber to harden or deteriorate.

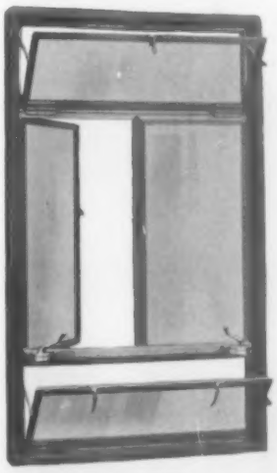
Narrow sash and frame members
—increase glass area; admit more light without increasing window size.

Continuous resilient weatherstripping
—of special metal alloy; insuring a completely air- and water-tight seal throughout the entire perimeter of sash.



Standard Series "K" Projected Window

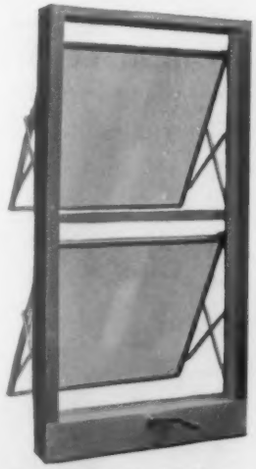
"WINDOWS BY GENERAL BRONZE" REPRESENT A SOUND INVESTMENT AND TRUE ECONOMY



Standard Series "K" Casement Window

A Few Recent School Installations

Building	Location	Architect
Rackham Graduate School	Ann Arbor, Mich.	Smith, Hinchman & Grylls
St. Pascal's Baylon School	St. Albans, L. I.	Fred J. Burmeister
Bloomfield Jr. High School	Bloomfield, N. J.	Starrett & Van Vleck
Park School	Ossining, N. Y.	Frederick Mathesius
Croton Elementary School	Croton-on-Hudson, N. Y.	Adolph H. Knappe
Junior-Senior High School	Harrison, N. Y.	Robert F. Vignola
Purdue University-Men's Residence	Lafayette, Ind.	Walter Scholer
Louisiana State University	New Orleans, La.	Weiss, Dreyfous & Seiferth
East New York Vocational High School	Brooklyn, N. Y.	Eric Kebbon
Midwood High School	Brooklyn, N. Y.	Eric Kebbon



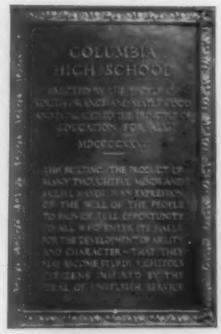
Standard Series "K" Projected Window—Mechanically operated

A Typical Classroom equipped with Permatite Windows

Pioneer Woman
Bryant Baker, *Sculptor*

General Bronze Architectural and Ornamental Metal Work, Tablets, Statuary and Ornamental Pieces executed in true craftsmanship in Bronze, Aluminum, Stainless Steel and Nickel Silver are found in Schools and Colleges throughout the world.

Catalogs, Literature and detailed Specifications on Request



Tablets are fabricated in all types and sizes

ATHEY COMPANY

6034 West Sixty-Fifth St.

Chicago, Illinois

PERENNIAL WINDOW SHADES
CLOTH-LINED METAL WEATHERSTRIPS
ATHEY SEALTITE CAULKING COMPOUNDS

Athey Perennial

ATHEY DISAPPEARING SKYLIGHT SHADE
ATHEY VENETIAN BLINDS

Information and prices on request

ATHEY PERENNIAL WINDOW SHADES

Athey Perennial Window Shades are ideal for use in school and college buildings of all kinds, for, being translucent, the shades with the sun on them throw a soft light over the room, giving sunlight without glare, and conserving the eyesight of the pupils.

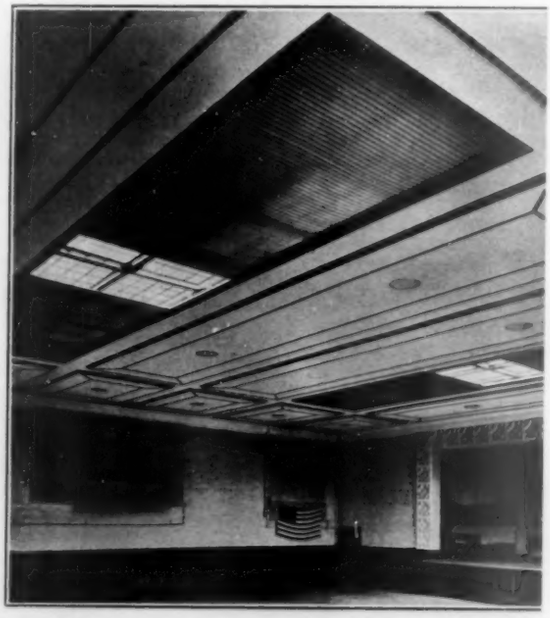
Being instantly adjustable to cover any part of the window necessary, they permit the windows being opened at both top and bottom, insuring better room ventilation, and, operating on bronze guide wires, flapping of shades when window is open is eliminated.

Made of the strongest and most durable material ever used for shades, they last longer than other shades, so on a cost per year basis are the most economical shade obtainable.

They are exceptionally attractive with their cockle finish and pleats, coming in a choice of several colors, and in widths up to seventeen feet.

The black opaque shades are useful for darkening assembly rooms and classrooms for motion picture projection.

Schools, colleges and auditoriums find Athey Shades ideal for skylights, too — the translucent shades for protecting against glare and heat, and the black shades for darkening rooms for motion pictures.



National College of Education, Evanston, Ill.
Equipped with Athey Shades

Write for catalog.

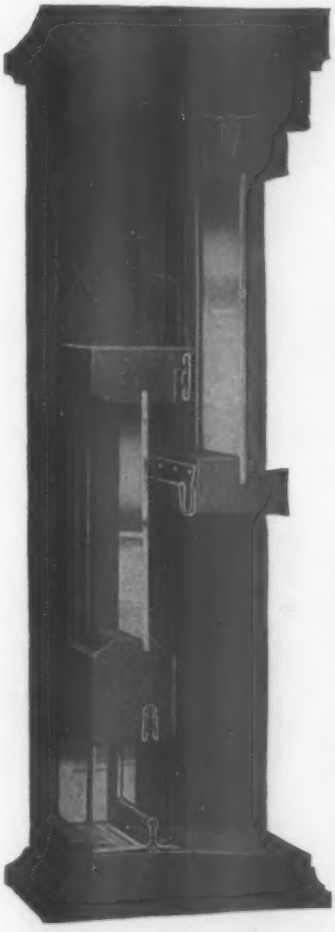
A Few of the Hundreds of Prominent Schools and Colleges Using Athey Shades:

St. Francis Academy	Joliet, Ill.
Saginaw High School	Saginaw, Mich.
State Normal College	Cortland, N. Y.
Junior Senior High School	Rye, N. Y.
Adelphi College	Garden City, N. Y.
The Choate School	Wallingford, Conn.
Wm. Penn Charter School	Philadelphia, Pa.
Henry Schaf School	Parma, Ohio
Solomon Juneau School	Milwaukee, Wisc.
Bisbee Public School	Bisbee, Ariz.
University of S. C.	Columbia, S. C.
Arlington School	Spokane, Wash.
University of Hawaii	Honolulu, T. H.
National College of Education	Evanston, Ill.
Nazareth Academy	Kalamazoo, Mich.
Junior High School	Ann Arbor, Mich.
Colt Memorial High School	Bristol, R. I.
Junior-Senior High School	Louisville, Ky.
Steuben High School	Milwaukee, Wisc.
University of Detroit	Detroit, Mich.
Toledo University	Toledo, Ohio
University of Nevada	Reno, Nev.
National College of Education	Evanston, Ill.

ATHEY WEATHERSTRIP

ATHEY Cloth Lined Metal Weatherstrip, the only weatherstrip using the cloth to metal feature, has been on the market for over 28 years. It has been installed on many of the best and largest buildings in the United States and Canada for owners and architects who desire the best, even though the initial cost is higher than for ordinary weatherstrip. Of our early installations we can point to St. Anthony's Hospital of St. Louis and the Blackstone Hotel of Chicago, who are still obtaining the maximum of efficiency after twenty-seven years of service, making the yearly cost low in comparison with cheap, ordinary weatherstrip.

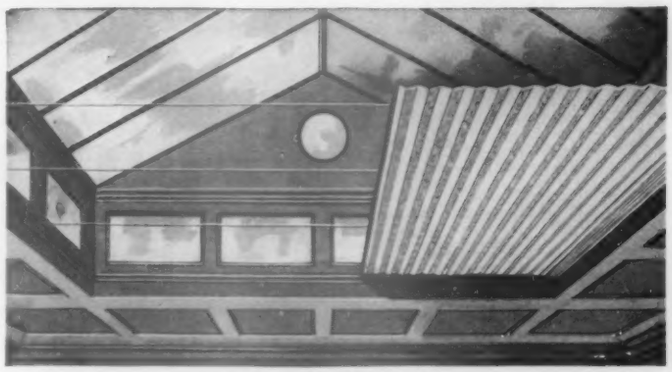
Unlike the ordinary channel used in many two-piece strip installations, the Athey channel is double the ordinary width and lined with a cloth material manufactured especially for this purpose, which not only prevents all air leakage but is a dust-proofing and sound-proofing as well. Rail members are also backed with felt, which prevents leakage at the jamb, a common weakness in ordinary weatherstrip installations due to infrequent nailing of the rail member. All cloth and felt used is chemically treated, guarding against rot and deterioration, so this part of the weatherstrip, as well as the metal, is guaranteed for the life of the building. The best grade of sheet zinc is used on all strip.



No drafts, rattling of sash when Athey strip is used, and the cost of your installation will be repaid in coal savings in from two to three years. Athey Weatherstrip is installed by authorized representatives with trained workmen. Write us for catalog and name of nearest dealer.

A few of the many Schools and Colleges using Athey Weatherstrip:

Streator High School, Streator, Ill.
Western Reserve Academy, Hudson, Ohio
Purdue University, Lafayette, Ind.
Cattaraugus School, Cattaraugus, N. Y.
Johns Hopkins University, Baltimore, Md.
Wesleyan University, Middletown, Conn.
Woodlawn High School, Birmingham, Ala.
Lincoln School, Great Falls, Mont.
Sandia School, Albuquerque, N. M.



Athey Skylight Shades

School lunchroom equipped with Athey Shades

Black Shades in use in Lexington High School, Lexington, Mass.

SEALTITE CAULKING

Knife or gun grade. Permanently elastic, impervious to heat or cold, adheres to wood, stone or metal, stainless. Standard colors white and gray, special colors to order. Approved by U. S. Bureau of Standards for government use. ***Write for Illustrated Booklet.***

COLUMBUS COATED FABRICS CORPORATION

(SCHOOLS DIVISION)
Columbus, Ohio

BONTEX

Washable Window Shade Cloth

HIGHEST QUALITY PYROXYLIN SHADE CLOTH--28 PATTERNS AND COLORS

BONTEX does more than meet the most exacting demands for quality in shade cloth. Made in a wide range of clean, clear colors, it fits into modern ideas of schoolroom efficiency by properly **controlling daylight** in any room. By choosing the type and color of Bontex shade that best fits the purpose of the room, the location and sun exposure, you can make your window areas serve your school as they should—with better light, for better vision, for better school work.

CONTROLLED DAYLIGHT WITH BONTEX

The function of the window shade is an all-important consideration in the manufacture of Bontex. Controlled daylight with Bontex means light of the right intensity—no sun glare—no disturbing light reflections from varnished, enameled, metal or other highly reflective finishes in common use.

Bontex provides tempered sunlight—toned down to the right intensity by three types of shade cloth to meet specific needs—for less eyestrain in schools, for higher efficiency and greater comfort, for each and every daylighting requirement in any school room.

Bontex **Translucent** Shade Cloth lets in maximum light without glare. Bontex **Semi-opaque** provides a softer, more diffused light. Bontex **Opaque,** absolutely black, excludes all light.

DURABLE, SCRUBBABLE, COLORFAST

Bontex pyroxylin-impregnated shade cloth has never been known to pinhole, fray or crack. It is built to endure beating sun, wind and rain, and hard everyday use. Can be scrubbed twenty times or more with soap and water and a brush without impairing the quality or original finish. Tested and approved by the Delineator and Lux Laboratories and proved colorfast by the Florida Test Service. Its quality is guaranteed by the Government label.

THE ECONOMICAL SHADE CLOTH

The long life of Bontex and its small extra cost clearly make it an economical investment. Figuring the cost of cutting, measuring and installing as part of each replacement, there is little to be saved by skimping the quality of shade cloth. The real saving comes by avoiding frequent replacement—a saving made possible by time-tested Bontex quality.

Left:
One of the Bexley Classrooms Equipped with Bontex Shades

Waterproof, Colorfast, Bontex Retains Original Finish After 20 or More Scrubbings

Brooklyn Technical High School, Brooklyn, N. Y., Equipped with Bontex

Bontex Window Shades Serve This Modern High School, Bexley, O.

Write for Bontex Sample Book

It's free to School Officials so you can see the wide range of patterns and test this superior shade cloth to your complete satisfaction. Shows the complete line of 12 plain colors. 5 beautiful corded designs, 5 duplex colors and 5 modern printed patterns, translucent, semi-opaque and opaque black.

PITTSBURGH-CORNING CORPORATION

Grant Building, Pittsburgh, Pa.

PC GLASS BLOCKS

For better light, privacy, quieter rooms, lower heating and maintenance costs in schools

In schools and colleges throughout the country PC Glass Blocks have proved their value in scores of different ways. They are outstanding in practical, utilitarian advantages, as well as being modern and good looking

Advantages of PC Glass Block construction for school and college buildings

BETTER LIGHTING WITH PRIVACY

PC Glass Block panels bring generous amounts of well-diffused daylight into school and college buildings. They fit in admirably with the present trend toward more extensive light areas in schools, where good daylighting is especially vital for the protection of students' eyesight. Skilful use of PC Glass Blocks also results, usually, in substantial savings in artificial lighting costs.

With their fine light transmission properties, PC Glass Blocks combine the advantage of non-transparency. By the use of PC Glass Blocks, rooms can now be well lighted, yet the students cannot be disturbed by outside distractions. PC Glass Blocks are equally valuable in screening school activities from prying eyes from outside. And these blocks effectively insulate against outside sounds too.

BETTER INSULATION . . . LOWER HEATING COSTS

PC Glass Blocks provide twice the insulation value of ordinary single glazed window sash. Their insulation value is approximately that of a solid masonry wall. This property of PC Blocks usually results in definite savings both in original and operating costs of school heating equipment.

LOWER MAINTENANCE COSTS

PC Glass Blocks cut necessary maintenance on light areas considerably. They are easy to clean, and require cleaning less frequently than ordinary windows. Having no sash to rot or corrode, they eliminate entirely the usual maintenance item of repainting or replacing window sash.

WHERE TO USE PC GLASS BLOCKS

In school and college buildings throughout the country, PC Glass Block construction has been used with outstanding success for the following purposes:

In classrooms, libraries, lecture and study halls to aid student concentration and promote eye-comfort by better lighting. In stairwells, to make staircases better lighted and safer. In corridors, to furnish borrowed light from classrooms. In gymnasiums, swimming pools, locker rooms and laboratories, where privacy combined with good lighting is imperative. And in any place at all where clean, good looking light areas improve a building's appearance.

There is a pattern, size and type of PC Glass Block to meet practically every requirement, including blocks designed to meet special light-directing and light-diffusing needs. PC Glass Blocks are manufactured by Pittsburgh Corning Corporation, and distributed by Pittsburgh Plate Glass Company and by W. P. Fuller & Co. on the Pacific Coast. For further information about PC Glass Blocks, write Pittsburgh Corning Corporation, 2018 Grant Bldg., Pittsburgh, Pa.

Stairwell installation of PC Glass Blocks in the Jefferson School, Ottawa, Ill. Architect . . . Louis H. Gerding

Gymnasium in the Arnold's Park School, Arnold's Park, Iowa, where PC Glass Blocks were used by Architect Orrin Thomas

THE STRUCTURAL SLATE COMPANY

EXECUTIVE OFFICES
Pen Argyl, Pa.

BRANCHES

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BUFFALO, N. Y., 116 Hamilton Blvd., Kenmore, N. Y.
CHICAGO, ILL., 737 N. Michigan Ave.
CLEVELAND, OHIO, Hanna Bldg.
DETROIT, MICH., 18451 Northlawn Ave.
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MEMPHIS, TENN., 215 Falls Bldg.
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PHILADELPHIA, PA., 244 N. 10th St.
PITTSBURGH, PA., Rm. 208 Investment Bldg.
ST. LOUIS, MO., 302 Board of Education Bldg.
SOMERVILLE, MASS., 43 Prospect St.
WASHINGTON, D. C., 327 Bond Bldg.

STRUCTURAL SLATE FOR VARIOUS SCHOOL USES

In addition to producing the world's best blackboard slate, Northampton and Lehigh Counties of Pennsylvania also produce an abundant supply of the highest grade structural slate for various other uses. The majority of the quarries in this far-famed slate district cooperate through one organization —the **Structural Slate Company**—in order to develop the most efficient standards of extraction, workmanship, assembling, distribution and methods of installation, as well as to encourage the maximum production and use of slate. All slate produced by this organization is thoroughly inspected before and after working, and is given the trade name of "Pyramid."

"CENTURIES OF SERVICE"
PYRAMID NATURAL SLATE STRUCTURAL
Proof against Time - Wear - Water - Fire!

"Pyramid" Brand slate assures the consumer of receiving always the highest quality of slate, selected by experts, and fabricated in any desired size for such uses as toilet enclosures, urinal stalls, shower stalls, laundry tubs, sinks and sink tops, stairways, caps, bases, wainscots and floors. Many standard sizes are always in stock, and deliveries can be made promptly. Normal capacity—5 carloads daily

Structural Characteristics of "Pyramid" Slate

Among the chief characteristics of structural slate from the Pennsylvania quarries are its **fine, even grain,** its **uniform color,** and its **cleavage or fissility,** which allows it to be split into slabs of any required thickness. Slate is also one of the **least absorptive** of nature's products, having a mean absorption of only 174/1000 of one per cent when immersed in water for 24 hours. It is also extremely **tough** and **elastic,** as manifested by its resistance to strain, shock, blows and the effect of settlement. Moreover, it **will not contract or expand** under changing conditions of heat or humidity.

Uses of "Pyramid" Structural Slate in School Buildings

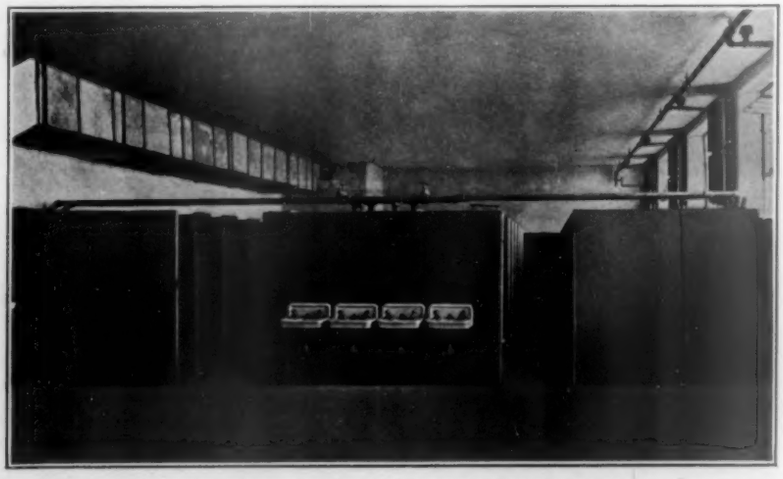
The most common uses of "Pyramid" structural slate in school buildings are for **shower stalls** and **toilet enclosures.** A review of the characteristics of structural slate in the preceding paragraph quickly shows why this slate is admirably fitted for these two uses. In selecting fixtures used for plumbing and sanitary purposes, slate will be found to fulfill easily the most rigid requirements with respect to resistance to wear and tear, sanitary qualities and imperviousness to water.

Other school uses for "Pyramid" Slate include:

BASE TREADS AND PLATFORMS TILE
RISERS SWITCHBOARD PANELS COPING
FLAGGING STOOLS & SADDLES SHELVING
PARTITIONS FLOORS & WALKS THRESHOLDS
URINAL STALLS WINDOW SILLS SINKS & TRAYS
ROOFING SLATE TABLE TOPS RADIATOR TOPS

Write us direct or our nearest Branch Office for estimates and any other information desired.

Use slate for stairways. It is fire-resistant and wear-resistant!



Slate shower installation in High School building, Bethlehem, Pa.

NATURAL SLATE BLACKBOARD CO.

Pen Argyl, Pa.

For Branch Offices, Refer to Catalog of Structural Slate Company

The Company

The **Natural Slate Blackboard Company** was organized in 1916. It includes a number of member quarries in Lehigh and Northampton Counties of Pennsylvania. Acting as the co-ordinating agency for these quarries the Company has been able to greatly increase the efficiency of production and selling by standardizing the grading of blackboard slate and developing modern methods of installation.

Combined mill equipment service and storage facilities assure expert finishing, large stocks of all sizes and prompt delivery.

Advisory Service

Facilities of all member companies are placed at the disposal of architect, school official and school board through the Service Department of the Company. Branch Offices or representatives welcome an opportunity to co-operate in solving blackboard problems and have available at all times local and State requirements governing schoolroom blackboards. Proper preparation of specifications and selection of best methods of installation determine satisfactory performance and we recommend consultation with these specialists before specifications are drafted.

ADVANTAGES OF NATURAL SLATE FOR BLACKBOARDS

Before deciding on the material for blackboards certain factors should be carefully weighed and a decision reached on the basis of minimum upkeep cost, maximum ease of use and serviceability and length of life. To make such a comparison easy we present below data regarding blackboard slate which has been proved by service and laboratory tests for more than 70 years.

Permanently Flat Surface—Due to its natural geologic formation slate has a dense, compact structure which provides a permanent guarantee against curling, cracking and buckling. Slate will always remain in a flat, uniform plane providing a perfect surface on which to make and erase chalk marks.

Toughness—Slate possesses a remarkable degree of toughness and elasticity which is manifested by its resistance to strain, shock, blows and the effect of settlement.

Non-absorption—If a blackboard material does not have a high resistance to absorption the water used in cleaning will eventually penetrate the board, ruin the writing surface, shorten the life and sooner or later compel expensive replacements.

Tests have demonstrated that, either by weight or volume, the greatest absorption of slate is one hundred and fifty one-thousandths less than one percent for complete immersion for not less than eight hours. With only one side exposed the absorption would be much less. (Tests by U. S. Bureau of Standards.)

Non-expansion—Heat, cold or other atmospheric changes cannot affect slate. Its expansion and contraction are absolutely negligible and no allowance need be made for expansion in installing slate blackboards. (Tests at Watertown Arsenal.)

Color—Natural slate blackboards will retain their color indefinitely, since the color is uniform throughout the thickness of the board. There is nothing to bleach or fade; the lime content is less than 4%. The cleaning and maintenance of slate in perfect writing condition is a simple matter of erasing and washing—the surface is permanent.

Selection and Finishing—With the products of various quarries available the selection of slate for blackboards of the finest quality is a relatively easy matter. Adequate mill equipment produces the finest surfaces as the slate slabs pass through the many finishing stages. Continuous inspection follows the slab at all times with a final inspection before the approved boards are labeled with the "Pyramid" trade-mark and placed in storage bins, according to size, ready for prompt assembly, fitting, shipment and installation.

BLACKBOARD REQUIREMENTS

Because of its long experience in the production of blackboards and its continuous contact with architects, school boards and State and local education authorities in all parts of the country, the **Natural Slate Blackboard Company** has long been consulted as specialists in visual aids to education.

In 1920 the company issued its first booklet on this subject for architects and others. Since then, that booklet has been reprinted several times and new editions have been prepared incorporating the most modern, up-to-date information.

In addition to its personal advisory service the Company now offers a 36-page manual—"Blackboards and Bulletin Boards as Visual Aids in Education." Changing instruction methods and curricula requirements have enlarged the use of visual aid materials and have made their selection, specification and installation more and more complex. This manual contains illustrations, drawings and text prepared by an architect for architects and which will prove invaluable as a time-saving help in the design of modern classrooms.

Copies of this book will be furnished on request to the Company at the home office or any branch offices.

Typical Class Room, Teachers College, Buffalo, N. Y. William E. Haugaard, Commissioner of Architecture, New York State

THE LOXIT COMPANY

605 W. Washington Blvd., Chicago, Illinois

LOXIT ALL METAL BLACKBOARD AND CORKBOARD MOUNTING SYSTEM

(Patents Pending)

THE SYSTEM

The Loxit system is more than just a ground or trim. It is a complete system combining a plaster ground with snap-on trim, including keys, springs, inserts, and clips to receive and hold the boards and trim, as self-contained units.

The system is designed to provide the maximum amount of adjustment, to assure rapid, economical and perfect installation and to maintain the permanent positions of the various parts after erection through automatic cushioning of the boards against reasonable contraction, expansion, settlement, etc.

FIREPROOF AND EYE STRAIN REQUIREMENTS

The Loxit system meets the sanitary and fireproof requirements usually encountered in this type of work, as the entire system is metal throughout. Using satin or Chromalite finish for the trim, eye strain is reduced to a minimum as these are dull finishes.

ERECTION

It is so simple in principle and construction that any good workman can install it with ease and perfection. All grounds are drilled, slotted, and mitred at the factory to board dimensions shown in drawings, ready to set in place. Special alignment braces are provided for all corners, tees, and joints, making the setting of grounds easy and the placing of trim neat and true.

The Loxit system can be used with any type and thickness of board from 1/8" to 3/8", the adjustment for variations in thickness being automatic.

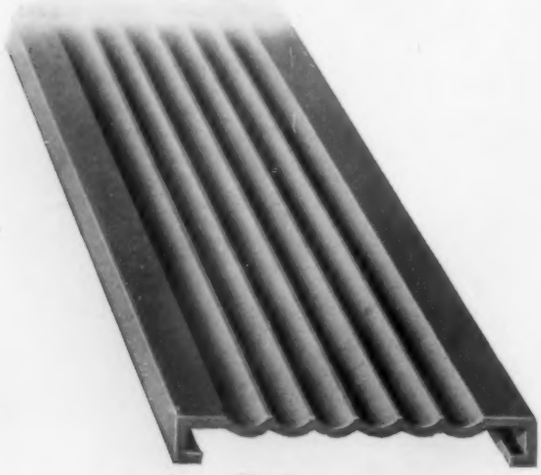


Fig. 3
Loxit fluted trim. New—Decorative

MAINTENANCE

For school and institutional work, we recommend * CHROMEDGE trim of dull satin finish for general use. It enables the care-taker to maintain the appearance of the trim with little effort. The metal having already been brushed to a satin finish, will not show slight scratches. Even deep scratches can be brushed out without showing, with a little effort.

With no parts that can burn, shrink, or warp, or that need painting, the Loxit system assures the minimum of upkeep while giving the maximum of service. (See finishes.)

Fig. 1
Loxit blackboard mounting system in place showing construction

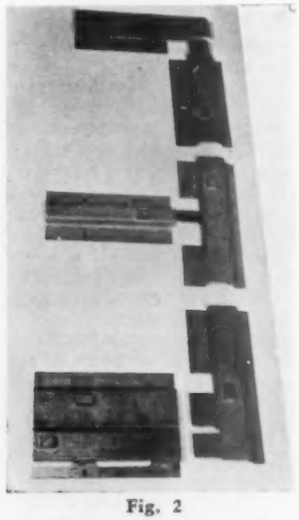


Fig. 2
Loxit blackboard mounting system showing its structural parts in detail

ACCESSORIES

Loxit fittings such as map hooks, paper clips, roller brackets, cork inserts, and their combinations are available for every purpose. They are designed to give a maximum freedom of movement and adjustment. They can be placed in and taken out from any point in the Loxit display rail; will slide freely into any position and cannot fall out, as a lower and upper groove automatically hold them to the rail.

MODERN DESIGNING

Special Mouldings:—While we are prepared to execute specially designed trim sections on order in CHROMEDGE at the same comparative costs as our standard sections, we recommend the standard designs shown in our details as they were adopted after the most careful studies of all problems involved in the trimming of blackboards and similar panels.

* Reg. trademark.

LOXIT ALL METAL BLACKBOARD AND CORK BOARD MOUNTING SYSTEM (Cont.)

MATERIAL

Chromedge is not a plated metal. It is an alloy and therefore will never wear off. With a small amount of care, it will retain its beautiful finish. It is hard enough to stand abuse and yet it is of a softness and texture that is ideal from the workman's standpoint, making it easy to work, to set, and to maintain.

There are more than 300 other Chromedge mouldings in addition to Loxit Chromedge blackboard sections available for decorative and protective purposes for the use with wall and floor coverings, as well as for the trimming of desks, tables, counters, cabinets, panelling, window and door trim, chair rails, base, cornices, etc, etc. A judicious use of these materials in combination with Loxit blackboard and bulletin board trim offers a wide range of new possibilities particularly adapted to modern design and construction. Our technical staff is available for the study of unusual problems. (See pp. 80, 81.)

BENDING

We can bend any Chromedge section the hard as well as the easy way to any reasonable shape at a reasonable cost. Curves can, therefore, be used where wanted to carry out a design.

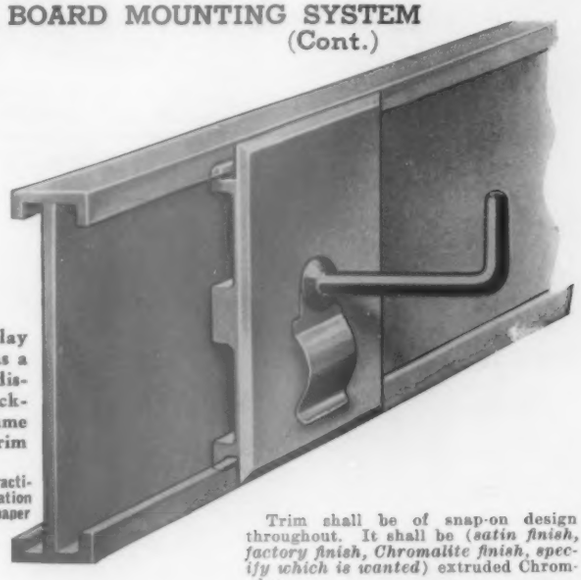


Fig. 5

Loxit snap-on display rail. It may be used as a combination trim and display rail at top of blackboards as it is the same width as the Loxit trim sections

Note the neat, practical Loxit combination map hook and paper clip

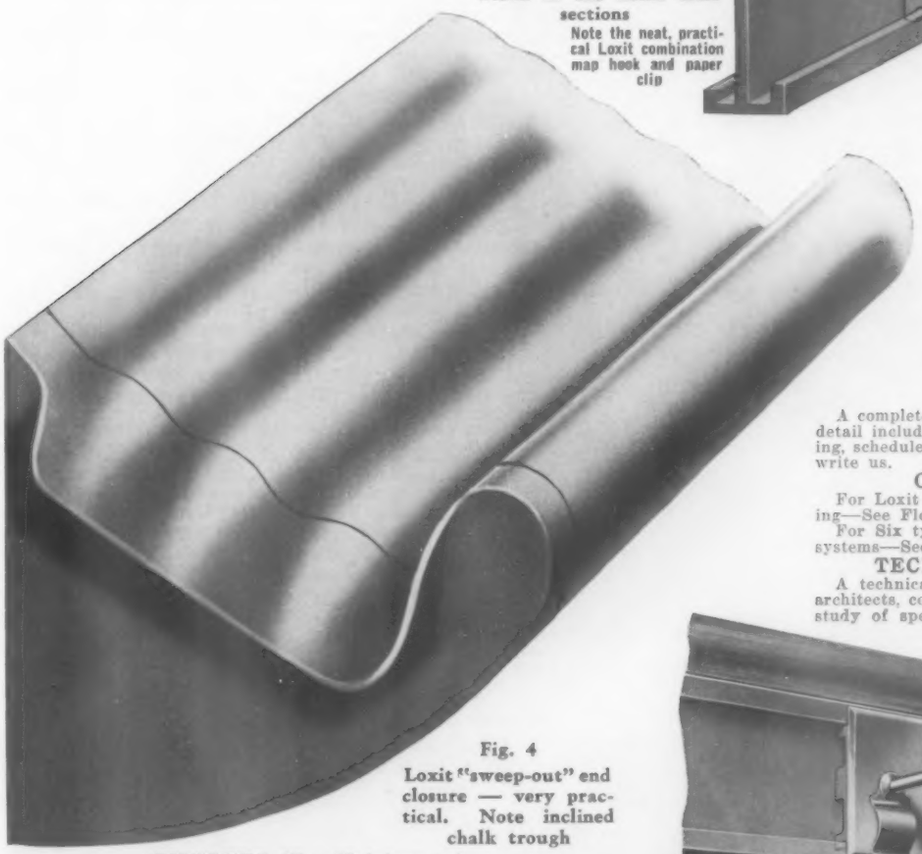


Fig. 4

Loxit "sweep-out" end closure — very practical. Note inclined chalk trough

FINISHES (See Maintenance)

CHROMALITE:—This finish is obtained by submitting Chromedge to an electrolytic process which fixes the surfaces of the metal against oxidation. It is a permanent finish, slightly milky white in color and has no glare. The finish is rich as well as restful in appearance. The cost is a little more than standard finishes but where smudging may occur such as on counter facings, Chromalite should be used.

SPECIFICATION — LOXIT ALL METAL BLACKBOARD AND CORK BOARD INSTALLATION

The system employed for this work shall be what is known as the Loxit all metal blackboard system. It shall be installed strictly in accordance with instructions issued by The Loxit Company, 605 W. Washington Blvd., Chicago. Same shall be complete with (*or without*) apron under chalk trough.

Grounds shall be secured to supporting walls with 10 penny wire cut nails, expansion or toggle bolts, at approx. 12″ o.c. for blackboards and 18″ elsewhere as required (*or as directed by the architect*). Grounds will be set with face flush with plaster line, plumb and true to board dimensions shown on drawings so as to assure the proper alignment for trim and tight closures of trim miters. Grounds shall be fabricated from 18 ga. U.S.S. extra tight coat galvanized sheet steel.

Trim shall be of snap-on design throughout. It shall be (*satin finish, factory finish, Chromalite finish, specify which is wanted*) extruded Chromedge.

After blackboards and cork boards have been set by others, contractor shall apply all trim in a neat workmanlike manner, mitering the corners. Chalk trough with end closures properly applied shall butt up to the trim at each end.

Chalk trough shall be Loxit inclined type (*standard Loxit flat type*) with plain (*or sweep-out*) end closures.

Furnish the following accessories: 1 Pair of Loxit roller brackets for each run of display rail. One combination Loxit map hook and paper clip for each 18″ of display rail.

LITERATURE

A complete catalog describing the Loxit system in detail including full size drawings suitable for tracing, schedules, etc., is available upon request. Please write us.

OTHER LOXIT ITEMS

For Loxit floor system using standard strip flooring—See Floor Section.

For Six types of Loxit acoustical tile suspension systems—See Acoustical Section.

TECHNICAL CO-OPERATION

A technically trained staff is at the disposal of architects, contractors, and school authorities for the study of special problems in connection with cork board, bulletin board, and blackboard installations.

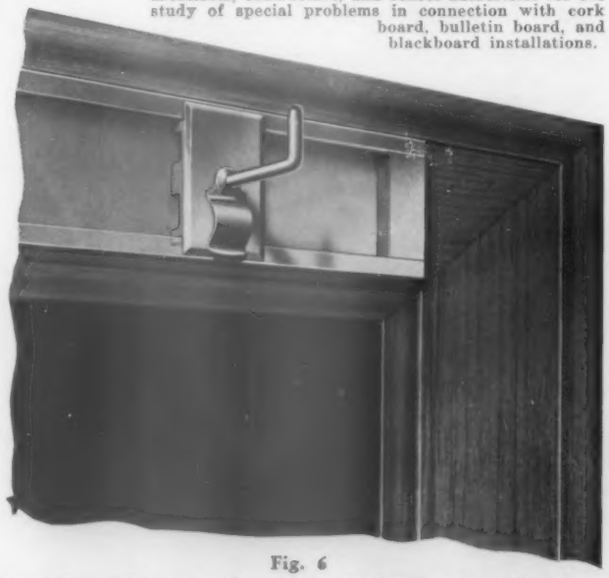


Fig. 6

Loxit-Chromedge screwed on type of display rail with all accessories is available for use on existing blackboard and cork board trim where display rails have not been provided for

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Quarriers and Manufacturers

Bangor, Pa.

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Blackboards	Stair Treads
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And structural slate for all requirements

PARAMOUNT VELVET FINISH SLATE BLACKBOARDS

All slate designed for blackboards is subjected to rigid inspection and only clear blemish-free stock is used. This selected slate is polished by machine until it is entirely free of sand pits and of any surface irregularity. The level surface is then gone over carefully by hand. It is this final hand rub that produces the Paramount Velvet Finish—a writing surface of permanent satisfaction.

Facilities: Our quarries and reserve stock are adequate for all demands. Whatever your slate requirements, we invite you to avail yourself of our consulting service.

SPECIFICATIONS COVERING "PARAMOUNT" NATURAL SLATE BLACKBOARDS

QUALITY: All Blackboard Slate shall be quarried in the United States and be of the finest quality selected blackboard stock, even black color, free from veinings or imperfections that would impair its use or durability as a marking surface.

THICKNESS: The thickness of all finished blackboards shall be not less than ¼ inch nor more than ⅜ inch. A maximum deviation of 1/16 inch from this thickness will be permitted when an average thickness of at least ¼ inch is maintained except that double surfaced slate shall be of uniform thickness.

FINISH: The writing face of each blackboard shall be carborundum surfaced to a true, even, uniform and finely smoothed surface. Each blackboard shall be furnished with joints ground straight, true and neatly fitted.

HEIGHT: The height of all blackboards shall be 3′ 0″, 3′ 6″, or 4′ 0″ high (designate which height).

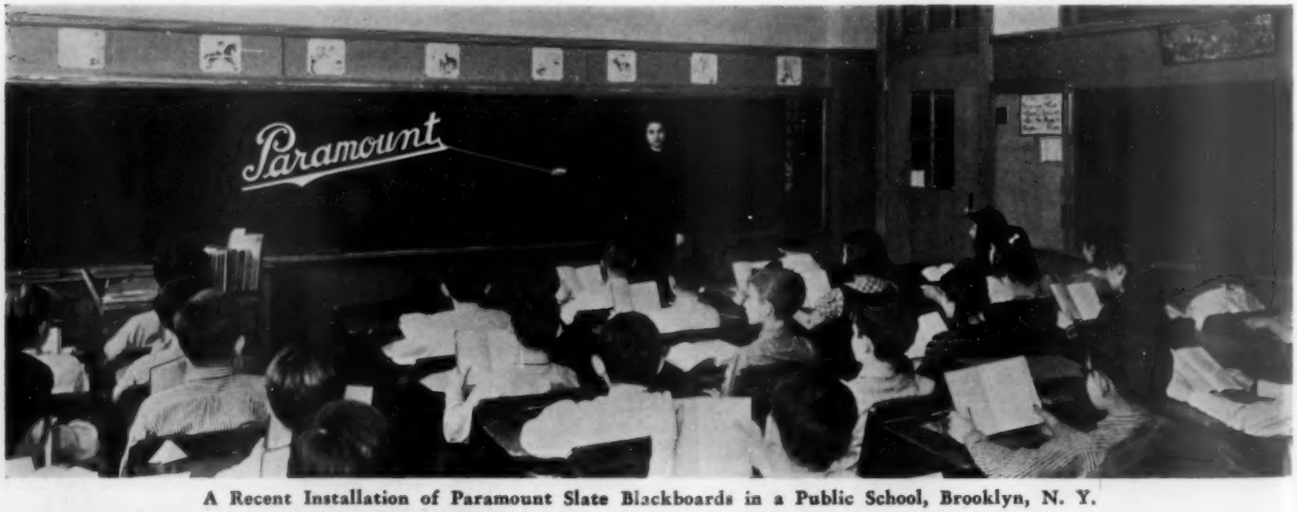
LENGTH: The length or lineal dimensions of the slate in each assembly of blackboards shall be in accordance with the U. S. Department of Commerce Simplified Practice Recommendations No. R15-35, all as follows:

Up to 5 feet, one slab;
Over 5 feet, but not exceeding 9 feet, two slabs;
Over 9 feet, but not exceeding 13 feet 6 inches, three slabs;
Over 13 feet 6 inches, but not exceeding 16 feet, four slabs;
Over 16 feet, but not exceeding 22 feet 6 inches, five slabs;
Over 22 feet 6 inches, but not exceeding 27 feet, six slabs.

JOINTS: The joints in each assembly shall be in accordance with the same Departmental Recommendation, namely, at or near the middle of the space for two slabs, one-third of the space for three slabs, one-fourth of the space for four slabs, one-fifth of the space for five slabs and one-sixth of the space for six slabs.

By "at or near" is meant that any slab may be used which places the joint within three inches in either direction of what would be exact spacing of the units stated.

BOLGER-HELLER SLATE COMPANY, INC.,
BANGOR, PENNSYLVANIA.



A Recent Installation of Paramount Slate Blackboards in a Public School, Brooklyn, N. Y.

Norton Door Closers

are manufactured by the

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Division of the Yale & Towne Mfg. Company

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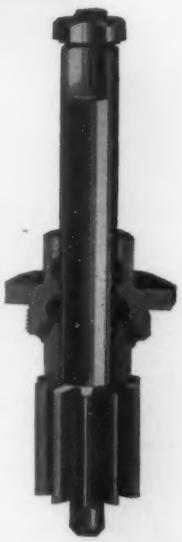
LOWEST MAINTENANCE COST. School authorities of the nation's finest schools select Norton Door Closers because they embody all the important features for long service and efficient operation. Built on the rack and pinion principle, the Norton controls the entire swing of the door —less strain on the closer, door and hinges.

New school buildings bring new door control problems. By anticipating school requirements year after year, Norton Door Closers are ahead in engineering design. They are built to meet every possible condition. Consult, without obligation, Norton Door Closer Company, which is prepared to recommend a solution for any door control problem.

All Norton Door Closer parts are of high-quality material. The exactness of manufacturing standards results in an accurate, smooth working closer. Write for the new Norton Catalog.



LEAKPROOF. A specially engineered leakproof packing nut makes it possible to use the correct lubricant, mineral oil. This minimizes friction and wear of the carefully machined working parts.

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Manufactured by

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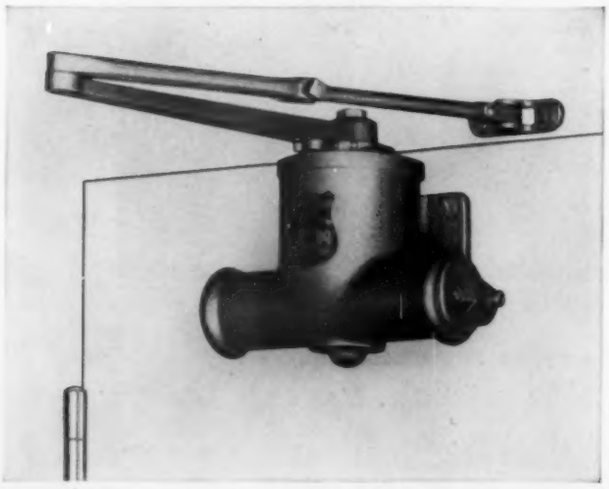
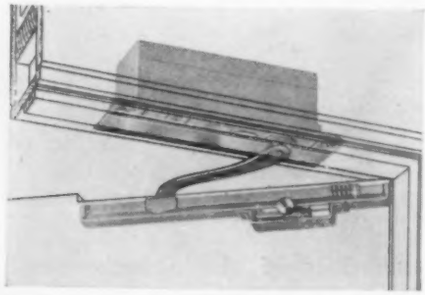
"You can save money and gain in smooth operation of plant by having the right door closers. If you don't already use LCNs, why not send for information on the full LCN line, which we just can't show on this page. No obligation at all."

THE ENTIRE LCN LINE, IN PRINCIPLE, IS BASED ON THE STANDARD SURFACE DOOR CLOSER



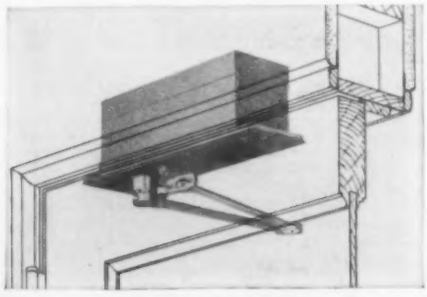
LCN STANDARD SURFACE TYPE CLOSER SIX SIZES — A TO F. A WIDE VARIETY OF FINISHES WITH OR WITHOUT HOLD-OPEN ARM

This is the utility closer most widely used in educational and other institutional buildings, where long life and superior performance at low cost are the important factors and the use of concealed closers for better appearance is impractical. It has an oversize coil spring of special analysis steel, with ample reserve power. It has the LCN full rack-and-pinion checking mechanism and ingenious adjusting screws which provide delicate control of door to fit conditions; "back check" action to protect walls or furniture on the opening swing; and two-speed action in closing and latching the door. It delivers the utmost in service, economy and general value to be found in a surface type door closer.



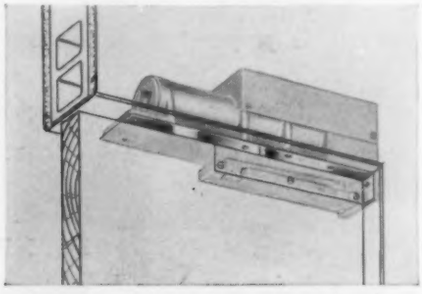
LCN SINGLE ACTING OVERHEAD CONCEALED DOOR CLOSER, NOS. 202, 204 AND 206

Recommended for entrance and other doors where appearance is important. Closer mechanism is completely concealed in the head jamb and door, with only the graceful flat steel arm visible when door is open. Full rack-and-pinion checking device with two-speed closing action easily adjustable. Furnished with or without hold-open feature.



LCN SINGLE ACTING OVERHEAD CONCEALED DOOR CLOSER, NOS. 502, 504 AND 506

Outswinging wooden entrance doors, unprotected by porch or deep reveal, are best handled by this closer, similar to the 204 or 206 except that a pair of exposed lever arms are used, which are kept on the inside of the opening.



LCN DOUBLE ACTING OVERHEAD CONCEALED DOOR CLOSER, NOS. 444, 466

With mechanism hidden in head frame and top of door, this closer furnishes smooth, complete, safe control of medium to heavy double acting doors in corridors and kitchen-dining room areas.

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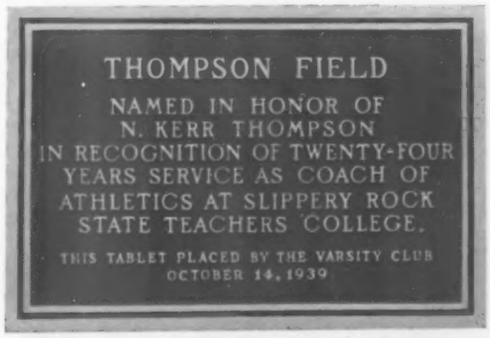

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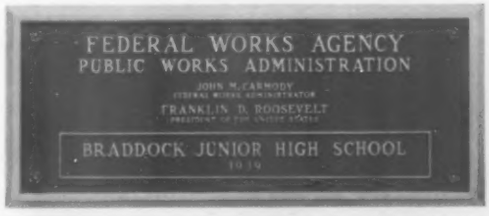

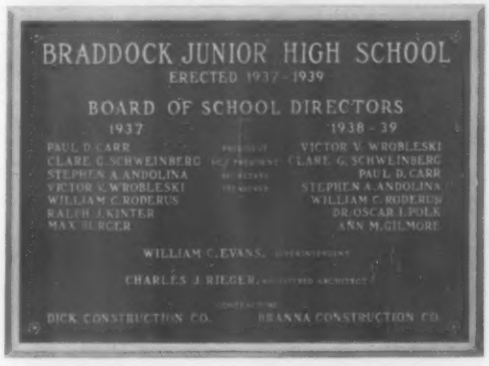

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18″ x 10″ and 18″ x 24″
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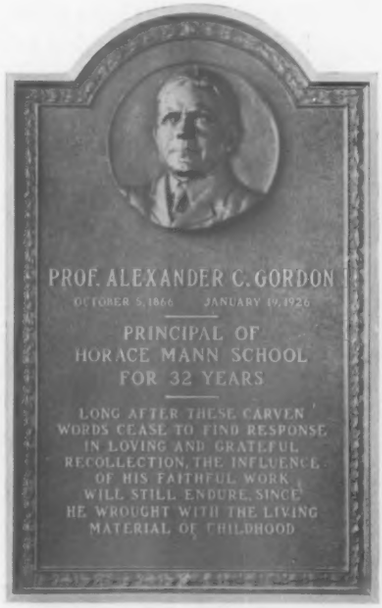
Memorials to founders—benefactors—college presidents or notable alumni inspire the daily lives of students. Honor rolls memorialize the names of alumni who died on the fields of battle. Trophies of honor are presented for developments in research, scholarship or athletic ability.

Whatever the memorial, if made by Matthews, it will be most appropriate and of finest craftsmanship. Master patterns make Matthews memorials less expensive, but if desired, we will work from designs created by you. Tell us the approximate size and wording and we will promptly send you literature, sketches and prices.



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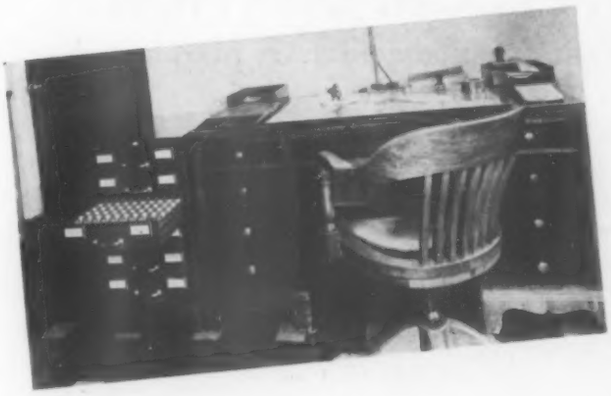
When population was scattered, buildings small and management more personal, the control of keys offered no problem. A "key rack" furnished by the local carpenter with cup hooks and with paper identification tags for keys solved most requirements.

With the advent of the "skyscraper," the hospital for hundreds of patients, the school for thousands of pupils, large businesses with tens of thousands of employees, the problem of maintaining locks and handling and controlling keys became a major problem **if the original value and purpose of the locks were to be preserved.** It is nothing extraordinary today to have accumulations of thousands, tens of thousands, of locks in one institution with two to five times that number of keys.

The mere housing alone of these accumulations of keys became a confused and confusing problem. Demands were made for a better, a more comprehensive and systematized method of housing and controlling; for a simple, easily operated system that would eliminate the confusion and lack of control of the older methods and reduce the rising costs of lock maintenance, variously estimated at from 50¢ to $1.50 per lock per year during the life of a building.

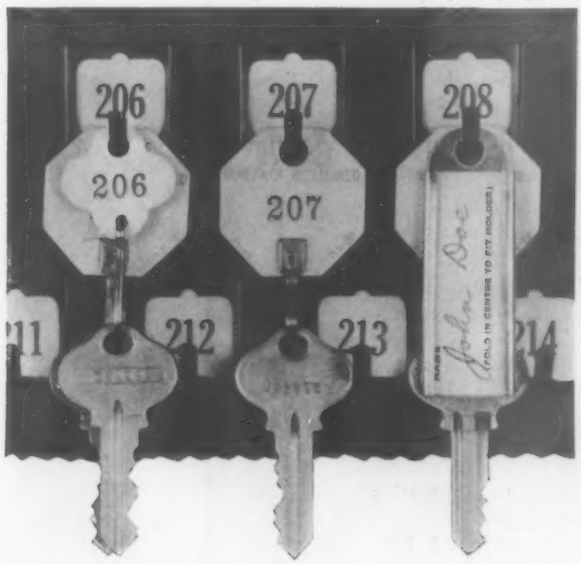
TelKee was offered in 1929 in response to this demand and as a solution of these problems. Today it has been a contract item on the General Schedule of Supplies of the U. S. Treasury Department for the past eight years, is required equipment with many States and Municipalities for Public Buildings and is in use as well in Office Buildings, Banks, Schools, Colleges, Hospitals, Hotels, etc.,—wherever locks are used and valued.

It has a particular value in increasing efficiency and lowering maintenance costs in Colleges and High Schools with their wealth of scientific locked equipment in addition to the usual building locks.



TELKEE IN OPERATION

FULL SIZE SECTION OF KEYBOARD, SHOWING TYPICAL TELKEE SYSTEM ARRANGEMENT



Our services are at the disposal of Architects, School Boards, Plant or Building Superintendents for consultation or to make surveys of requirements, reports of findings and suggestions. If furnished with the number of locks, the keys for which it is desired to place under adequate control, we will furnish details and cost of equipment for the required capacity.

Write for complete twelve-page descriptive catalog with samples of System Accessories.

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Also manufacturers of Westinghouse Hollow-Spun lighting standards for Westinghouse Electric & Mfg. Company. Consult local representatives of our agents as to designs and latest prices.

Thousands of municipalities are benefiting from low maintenance costs of **Spun-Crete** and **Hollow-Spun** standards.

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These fountains, designed for parks and school playgrounds, are available in single and multiple bubbler designs. Fountains are water polished art marble and equipped with latest chromium plated brass angle stream bubblers, meeting all health and sanitary requirements. Designs and prices on drinking fountains are listed in the W. S. Darley & Company's municipal catalog, or, write our Company for further information.

In addition to illustration shown we make our New American No. 634 single bubbler and Washington No. 633 4-bubbler as stock designs. Special designs.

LIGHTING STANDARDS

The illustration, our Hy-Lite with No. 312 Bracket, is one of a hundred or more designs available to architects in connection with school projects or for building accessories. Our standards are arranged with proper adaptors for attachment of luminaires. **Spun-Crete** standards are manufactured by the centrifugal process, producing dense, low water-cement ratio, high strength concrete in special patented machines. Our water polished terrazzo finish is attractive in appearance and low in maintenance costs. Lighting standards are available in standard colors black and white granite or any special color upon request.

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Description, Sizes or Thicknesses

Floor Tile or Slabs—Plain and non-slip. 6x6 in.; 9x9 in.; 12x12 in.; 15x15 in.; 10x20 in.; 12x24 in. 1 in. thick.

Base — Straight and cove profiles. 3 in.; 4 in.; 5 in.; 6 in.; 8 in.; 9 in.; 12 in.—corners integral. 1 in. thick.

Wainscot—Ashlar type and large slabs. From small units up to 4 ft. by 7 ft., slabs 1 in. thick.

Partitions — Toilet, shower and dressing room. All sizes —minimum thickness 1⅛ in. —cast integral with mullions.

Shower Receptors — With and without curbs. All sizes 3x3 ft. up, with or without curb—minimum thickness 1½ in.

Treads—Plain, non-slip, inlaid designs. Lengths up to 9 ft. or more.

Steps—Plain, non-slip, one or two-piece construction Tread or riser cast integral—see detail.

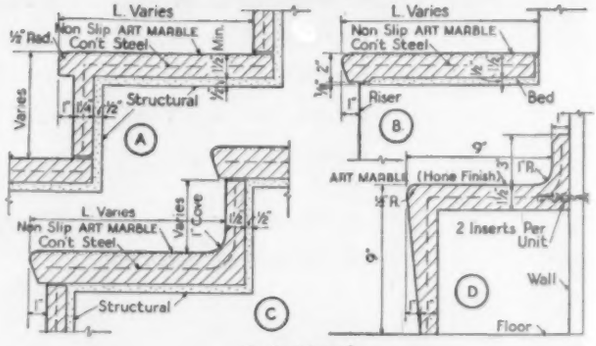
Shelves, Seats and Benches—Any size or design. Any thickness; seats, usually minimum 2 in.

Window Stools—Any size or shape required. Any profile nosing with or without grill inserts.

Swimming Pool—Gutters and curb; structural wall slabs. Any profile drains cast integral.

2 in. and 3½ in. thick for two types of construction.

Non-Slip Art Marble Stairs



Stair Details

TRAFFIC & STREET SIGN COMPANY

Flag Poles Made of Steel, Copper-Bearing Steel, Stainless Steel, Bronze and Aluminum

78 Foundry Street
Newark, N. J.

65 foot exposed height Continuous Tapered Flag Pole, Chancellor Ave. School, Newark, N. J.

TELESCOPED SECTIONAL FLAG POLES

Telescoped sectional flag poles are manufactured in three types: **standard, heavy, and extra heavy.** Stock sizes in copper-bearing steel furnished in lengths up to 100 feet in both roof and ground-set poles. Quick delivery can be made on poles up to 200 feet. All the joints are die swaged and shrunk.

CONTINUOUS TAPERED FLAG POLES

Continuous tapered flag poles are manufactured in two types: **Continuous straight taper, and Continuous entasis taper.** Straight tapered poles for roof and ground setting in copper-bearing steel are carried in stock up to 80 feet, and have a standard taper of approximately 1 inch in 7 feet. Quick delivery can be made on entasis taper, special taper, and standard taper poles up to 200 feet.

SAFETY NOTE

Architects working on new school buildings as well as all educational purchasing officials are urged to investigate the advantages for safety of steel as opposed to wood in flag pole construction. Wood poles which to all outward appearances are in good condition may have rotted inside to a point where they are early victims of the next strong blow. Furthermore, a good steel flag pole close to a building is excellent protection against lightning. Steel poles not only safeguard adjacent structures but can also be struck by a bolt without danger of collapse.

OTHER PRODUCTS

"Slow", "Caution", "School Zone" signs, Parking Regulation signs, Posts and Standards for all type signs, Radio Poles, Floodlighting Poles, etc.

CO-OPERATION WITH ARCHITECTS AND SCHOOL OFFICIALS

Due to our many years of experience in handling floodlight, sign, radio and flagpole problems of all kinds, we are able to offer architects, contractors and building owners a well rounded service in planning, detailing and specifying the flagpole and equipment best suited to each individual installation, location factor, and budget limitation.

We have an unusually wide selection of stock bases, and shall be glad to forward sketches of them on request.

We are also equipped to fabricate special bases in accordance with architects' sketches.

We suggest that rough sketches of contemplated flagpoles be submitted to us—in order that we may prepare details, specifications and estimates of complete costs. All services offered by **Traffic & Street Sign Co.** are, of course, without charge or obligation.

We likewise are able to recommend the maximum length and number of sections that assure the most economical freight rate to any part of the country.

REVERE COPPER AND BRASS INCORPORATED

EXECUTIVE OFFICES AND GENERAL SALES DEPARTMENT

230 Park Avenue, New York, N. Y.

REVERE BUILDING PRODUCTS

FOUNDED BY PAUL REVERE

1 8 0 1

Cheney and Revere Thru-Wall Copper Flashing for protecting buildings against seepage, leaks and efflorescence

Revere Sheet Copper and Leadtex (lead-coated copper) for roofing, gutters, conductor pipes, flashings, skylights, spandrels, decorative applications and termite proofing, also for range boilers

Copper Water Tube, Brass Pipe, Red-Brass Pipe and Copper Pipe for hot and cold water lines, and for lawn irrigation

Herculoy (copper-silicon alloys) for range boilers

CHENEY THRU-WALL COPPER FLASHING

Cheney pioneered and introduced mechanically keyed Thru-Wall Copper Flashing to the architects and engineers of America. Millions of feet have been installed in most of the federal government's fine buildings as well as in colleges, libraries, hospitals, public buildings and office buildings.

Prevents seepage and leaks

Wherever any part of a masonry wall is directly exposed to rain and snow, water seeps into the wall. Penetrating downward, it causes serious damage to both interior and exterior of a building, even to the astral disintegration of the walls. Alternate freezing and thawing of wet walls in cold weather disrupts the masonry, entails expensive repairs, and may even cause a parapet to fall to the ground. **Cheney Thru-Wall Flashing** positively prevents leaks and seepage, and may safely be specified by the architect for the most exacting requirements. It is especially recommended for exposed work.

Prevents defacement of interior plaster

Damp interior walls and ceilings with paint and plaster constantly falling, are a menace to health as well as an eyesore. Temporary repairs to masonry, plaster and paint are costly and fail to remedy the cause. Prevent trouble before it starts, by installing **Cheney Thru-Wall Flashing** when the building is erected.

Prevents efflorescence

Efflorescence appears upon the exterior or masonry wall as a whitish deposit. It is caused by water seeping down through the wall and carrying with it the mineral salts in the mortar and brick to the wall surface, where the water evaporates and leaves the unsightly whitish deposit. Efficient **Cheney Thru-Wall Flashing** is the best way to safeguard against this condition.

Features of Cheney Flashing:

Fundamentally, Cheney Flashing functions in a very definite manner:

1st: It forms a positive mechanical key-bond in **every direction** within the mortar bed—**vertically** as well as laterally.

2d: It provides **perfect** drainage so that if moisture should penetrate a wall, it will drain quickly.

3d: It provides adequately for expansion and contraction.

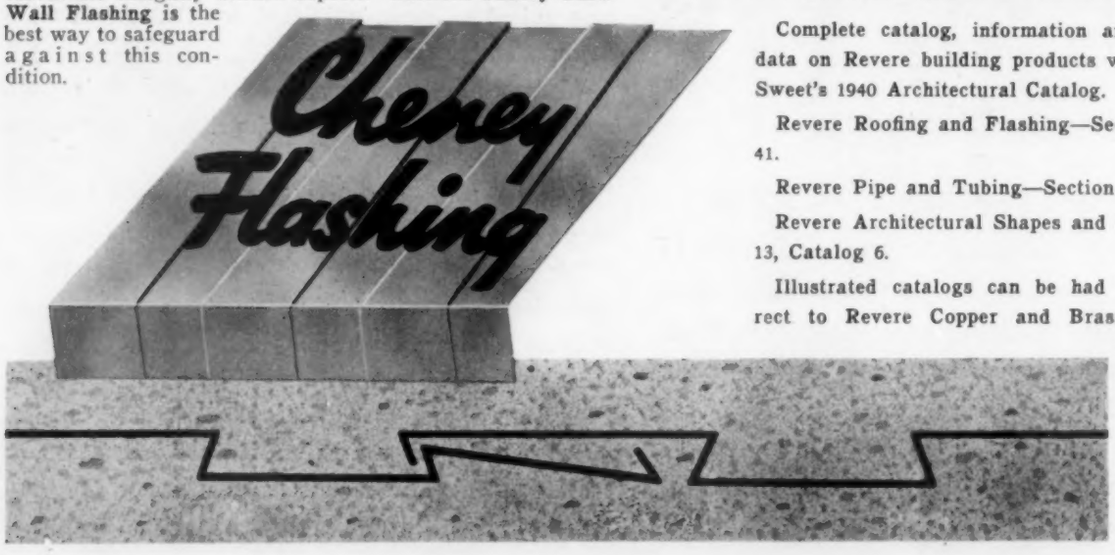
4th: It has a water-tight, interlocking lap that requires no soldering.

5th: It has a stiff counterflashing face that hugs the wall tightly after the base flashing has been installed.

Sizes:

Cheney Thru-Wall Flashing comes in sheet form in widths from 6 to 60 inches (in even widths) and in nine special forms. The standard overall length of the sheets is 42 inches.

Laying Coping Stone, 86th Story, Empire State Building, N. Y. Note Absence of Dowels. Cheney Flashing Permits Such Installations on Parapets and Copings. It's the Safe Flashing to Use



Complete catalog, information and specification data on Revere building products will be found in Sweet's 1940 Architectural Catalog.

Revere Roofing and Flashing—Section 6, Catalog 41.

Revere Pipe and Tubing—Section 27, Catalog 11.

Revere Architectural Shapes and Sheets—Section 13, Catalog 6.

Illustrated catalogs can be had by writing direct to Revere Copper and Brass Incorporated. Revere also offers, without obligation, the services of competent advisors to assist in individual problems.

AKINS SALES CO., INC.

828 Broadway, New York, N. Y.

Quality Products Which Have Stood the Test for Over 45 Years

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- BULLETIN BOARDS
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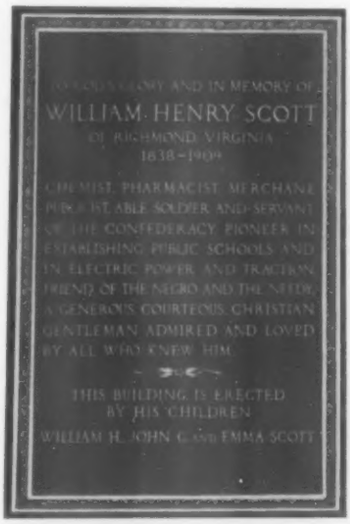
FLOOR DIRECTIONAL ARROWS
DESK NAME PLATES

CHANGEABLE LETTER MENU BOARDS

Made in various stock sizes, with wood, bronze, nickel silver or satin finish chrome Kalomein frames or solid bronze frame.

CAST BRONZE TABLET


WILLIAM HENRY SCOTT
OF RICHMOND, VIRGINIA
1838-1904
CHEMIST, PHARMACIST, MERCHANT
PUBLIC SPIRITED CITIZEN AND SERVANT
OF THE CONFEDERACY, PIONEER IN
ESTABLISHING PUBLIC SCHOOLS AND
IN ELECTRIC POWER AND TRACTION,
FRIEND OF THE NEGRO AND THE NEEDY,
A GENEROUS COURTEOUS CHRISTIAN
GENTLEMAN ADMIRED AND LOVED
BY ALL WHO KNEW HIM
THIS BUILDING IS ERECTED
BY HIS CHILDREN
WILLIAM H. JOHN G. AND EMMA SCOTT

Cast bronze tablets, plaques, historical markers, fraternity emblems, insignia and bronze letters.

CAST INDIVIDUAL BRONZE LETTERS

Made in Various Stock Designs and Sizes

DESK NAME PLATE

Cast bronze plate. Also made with Wood frame with changeable letters or Wood block with white embossed lettered card with beveled glass face.

HONOR ROLL BOARD

This honor roll is perpetual, because it uses easily changed letters.

ALL TYPES OF CHANGEABLE LETTERS SUPPLIED. DOUBLE PRONGED BRASS WHITE ENAMELED LETTERS; DOUBLE PRONGED FLAT CELLULOID LETTERS; DOUBLE PRONGED EMBOSSED CELLULOID LETTERS; SINGLE PRONGED COMPOSITION LETTERS; SINGLE PRONGED CAST ALUMINUM LETTERS

JOHN E. LINGO & SON, INC.

Established 1897 — Telephone: Camden 487

Manufacturers of

Flagpoles in Copper Bearing Steel, Stainless Steel, Bronze, Nickel Silver and Aluminum

29th Street & Buren Avenue

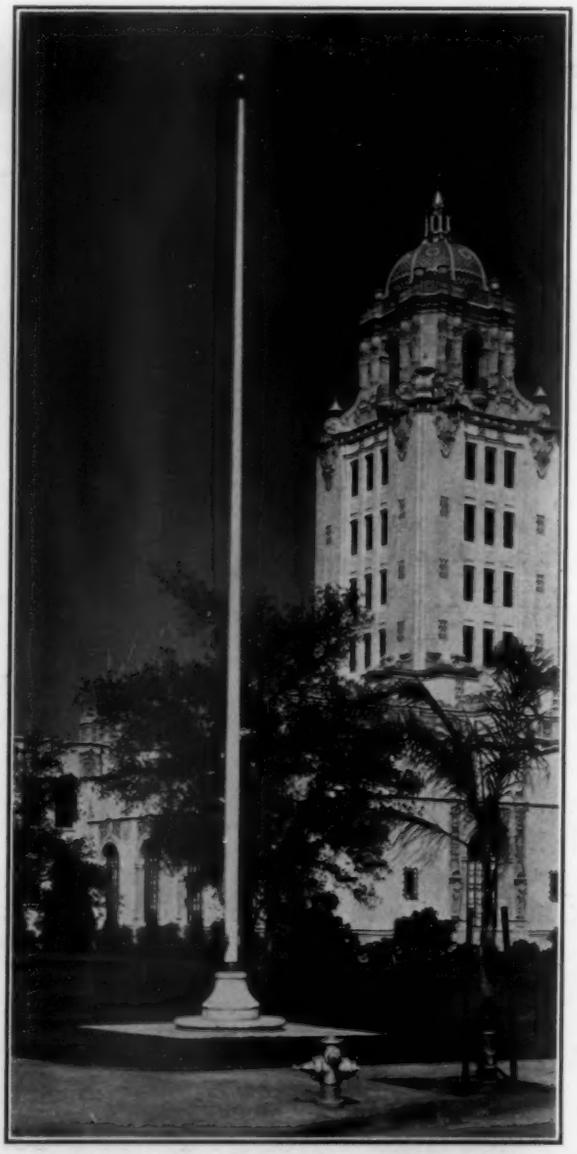
Camden, New Jersey

TWO DISTINCT TYPES OF STEEL FLAGPOLES

CONTINUOUS STRAIGHT TAPERED FLAGPOLES

Continuous Straight Tapered flagpoles are made of **new** high grade open hearth steel, have a smooth uninterrupted exterior surface throughout without visible joints and offsets, and resemble a wooden flagpole in appearance. They are standardized in lengths from 20 ft. to 200 ft. These poles are carried in stock and prompt shipments can be made.

Continuous Straight Tapered flagpoles are ideal as replacements of wooden flagpoles, for not only is the appearance the same but the steel pole affords lightning protection, unlimited life and dependability, not usually found in wooden flagpoles.



50 Feet Above Grade, Continuous Straight Tapered Heavy Type Steel Flagpole, City Hall, Beverly Hills, Calif.

SWAGED SECTIONAL FLAGPOLES

Swaged Sectional flagpoles are fabricated in sections of **new** full weight copper bearing steel pipe with hydraulic die-swaged, telescoped and shrunk joints, made without the use of bolts, rivets, pins, screw couplings or lead calking. They are standardized in lengths from 15 ft. to 200 ft. These poles are carried in stock and immediate shipment can be made.

OTHER PRODUCTS

We also manufacture Continuous Entasis Tapered Copper Bearing Steel, Stainless Steel, Bronze, Nickel Silver and Aluminum flagpoles standardized for ground, roof or outrigger settings, in various lengths and diameters. These poles are especially suitable for monuments, memorials and other buildings of exceptional Architectural design.

CATALOGUES AND SERVICE

60-page general catalogue and descriptive pamphlets giving full information, details, specifications, prices, etc., promptly mailed on application. Our Engineering Department will gladly assist you in planning your flagpole installations most satisfactorily and economically, without obligation on your part whatsoever.

QUALITY OF PRODUCTS

NEW MATERIAL **EXCLUSIVELY** IS USED IN THE MANUFACTURE OF "LINGO" FLAGPOLES. You are guaranteed that our pipe and tubing is new, full weight and mill tested. Affidavits and mill certificates attesting to the use of new material gladly furnished if desired. We do not use second-hand, untested, mill rejected, rerolled or light weight material. Red lead and other nontransparent primers serve as an ideal medium for hiding inferior materials and construction, so "LINGO" flagpoles are painted a shop coat of non-rust transparent varnish which permits immediate and positive inspection of the material and construction used. Your selection of a "LINGO" flagpole assures a high quality product, designed by pioneer flagpole manufacturers and constructed by competent mechanics.

Inspection of Your Present Flagpoles Now May Save Lives Later!

SECTION III
ARCHITECTS FOR EDUCATIONAL BUILDINGS

All the architects listed in this Directory are now at work on educational buildings or have designed a number of school and college buildings in recent years.

No attempt has been made to evaluate the skill or professional standing of the architects listed. Boards of Education and persons interested in the construction of new buildings can obtain valuable advice in this matter from the presidents of the local chapters of the American Institute of Architects, or from the national headquarters of that organization, The Octagon, Washington, D. C., and from such sources as the National Advisory Council on School Buildings, the United States Office of Education, the respective state departments of education, the Department of Education of the National Catholic Welfare Conference, and the Department of Educational Administration of Teachers College, Columbia University, New York.

Alabama

Birmingham

Henry Sprott Long, Martin Bldg.
Charles H. McCauley, Jackson Bldg.
Miller, Martin & Lewis, Title Guarantee Bldg.
Jack B. Smith, Martin Bldg.
E. B. Van Keuren, Inc., Farley Bldg.
Warren, Knight & Davis, Protective Life Bldg.

Gadsden

Paul W. Hofferbert, 220 S. 8th St.

Mobile

Wm. H. March, Box 813

Montgomery

Dittmar & Roberts, Vandiver Bldg.

Sheffield

Howard A. Griffith, Jr., 202 E. Fourth St.

Tuscaloosa

Don Buel Schuyler, First National Bank Bldg.

Tuskegee Institute

Louis E. Fry, Box 566

Arizona

Miami

Herman A. Bell, Box 1386

Phoenix

Louis S. Alexander & Douglas W. Burton, Title & Trust Bldg.
Orville A. Bell, Heard Bldg.
Lescher & Mahoney, Title & Trust Bldg

Tucson

James Macmillan, 537 E. Third St.
Roy W. Place, 11 E. Pennington St.

Arkansas

Fayetteville

Paul Young, Jr., McIlroy Bank Bldg.

Fort Smith

Haralson & Mott, Merchants Bank Bldg.
E. Chester Nelson, Merchants National Bank Bldg.

Little Rock

Brueggeman, Swaim & Allen, Gazette Bldg.
Erhart & Eichenbaum, Gem Bldg.
Hunter & Boyd, Professional Bldg.
McAninch & Anderson, Insurance Bldg.
Wittenberg & Delony, Pyramid Bldg.

California

Alhambra

Richard C. Farrell, 731 N. Marguerita Ave.
Scott Quintin, 317 W. Main St.
John Walker Smart, 1200 E. Alhambra Rd.

Bakersfield

Charles H. Biggar, Haberfelde Bldg.
Franklin & Kump, Jr., Haberfelde Bldg. (also in Fresno)
Stanton Willard, A. C. Metcalf and J. W. Wright, Associates, 1314 17th St.
Frank Wynkoop, Haberfelde Bldg.

Berkeley

John J. Donovan, 950 Parker St.
P. L. Dragon & C. R. Schmidts, 2068 Allston Way
Wm. C. Hays, 2924 Derby St.
W. H. Ratcliff, 2140 Shattuck Ave.

Chico

A. W. Story

Del Monte

Robert Stanton, Hotel Del Monte

Fresno

W. D. Coates, Rowell Bldg.
Franklin & Kump, Jr., Patterson Bldg. (also in Bakersfield)
David H. Horn, Rowell Bldg.
H. Rafael Lake, Mattei Bldg.
Perrine & Barker, 2014 Tulare St. (also in Los Angeles)
Fred L. Swartz, Brix Bldg.

Fullerton

Harry K. Vaughn, Chapman Bldg.

Glendale

Erwood P. Eiden, 106 E. Wilson St.
Postle & Postle, 501 W. Patterson St.

Hollywood

H. L. Gogerty, 6272 Yucca St.

Long Beach

Clarence N. Aldrich, 1834 Dawson Ave.
Kirtland Cutter, F. & M. Bank Bldg.
Warren Dedrick, Heartwell Bldg.
Francis H. Gentry & Jerome C. De Hetre, Jergins Trust Bldg.
D. Easton Herrald, 1st National Bank Bldg.
Jess J. Jones, F. & M. Bank Bldg.
Schilling & Schilling, 441 East First St.
Kenneth S. Wing, 501 Termino Ave.

Los Angeles

Allison & Allison, Edison Bldg.
John C. Austin, Chamber of Commerce Bldg.
M. L. Barker & G. Lawrence Ott, 624 S. LaBrea Ave.
Richard M. Bates, Jr., 3670 Wilshire Blvd.
Harold D. Cross, 124 W. 4th St.
Clifford K. Denman, 311 S. Spring St.
Ralph C. Flewelling, 816 W. 5th St.
Gable & Wyant, 3723 Wilshire Blvd.
Hibbard, Gerity and Kerton, 816 W. 5th St.
Arthur R. Hutchason, 816 W. 5th St.
Theodore Rider Jacobs, 2024 W. 6th St.
C. Raimond Johnson, University of Southern California
Gordon B. Kaufman, 627 S. Carondelet St.
T. C. Kistner, Architects Bldg.
Mackie & Squiers, Union League Bldg.
Marsh, Smith & Powell, Architects Bldg.
William Mellema, 1661½ Beverly Blvd.
Armand Monaco, 3021 Waverly Drive
Richard J. Neutra, 2300 Silverlake Blvd.
A. S. Nibecker, Jr., Board of Education, 1425 San Pedro St.
Llewellyn A. Parker, Architects Bldg.
Perrine & Barker, 1031 S. Broadway (also in Fresno)
Harry L. Pierce, 1443 Mt. Pleasant St.
Alfred W. Rea & Chas. E. Garstang, 215 W. 6th St.
A. F. Rosenheim, 1151 S. Broadway
Edward Cray Taylor, 803 W. 3rd St.
Carleton Monroe Winslow, Architects Bldg.
Henry F. Withey, 407 S. Western Ave.
David J. Witmer & Loyall F. Watson, Architects Bldg.
Wurdeman & Becket, 6536 Sunset Blvd.

Los Gatos

E. P. Whitman, 54 Cleland Ave.

Monrovia

Robert M. Finlayson, Central Bldg.

Monterey

C. J. Ryland, 136 Bonifacio Pl.

Palo Alto

Birge M. Clark & David B. Clark, 310 University Ave.

Pasadena

Robert H. Ainsworth, Central Bldg.
Walter C. Folland, 224 S. Oak Knoll Ave.
Elmer Grey, 1372 S. El Molino Ave.
Frederick Kennedy, Jr., 1041 E. Green St.
Marston & Maybury, 25 S. Euclid Ave.

Petaluma

Brainerd Jones, 226 Washington St.

Rialto

E. Charles Parke, R. 1, Box 67

Richmond

Keith O. Narbett, 468 31st St.

Riverside

G. Stanley Wilson, 3616 Main St.

Sacramento

Harry J. Devine, Cronan Bldg.
George C. Sellon, California State Life Bldg.

San Bernardino

Worswick & Culver, Fuller Bldg.

San Diego

H. Louis Bodmer, Commonwealth Bldg.
Frank L. Hope, Jr., San Diego Trust & Savings Bldg.
Jackson & Hamill, Bank of America Bldg.

Wm. Templeton Johnson, San Diego Trust & Savings Bldg.
William P. Lodge, Fifth Avenue Bldg.
John S. Siebert, Granger Bldg.

San Francisco

Bakewell & Weihe, 251 Kearny St.
Arthur Brown, Jr., 251 Kearny St.
Arnold Constable, 580 Market St.
Norman R. Coulter, 46 Kearny St.
Mark Daniels, 101 Post St.
W. P. Day, H. M. Michelson, Associate, 405 Montgomery St.
Edward A. Eames, 216 Pine St.
Henry H. Gutterson, 526 Powell St.
Masten and Hurd, 442 Post St.
Maybeck & White, 235 Montgomery St.
William Mooser, 244 Kearny St.
E. L. Norberg, 580 Market St.
Timothy L. Pflueger, 580 Market St.
Frederick H. Reimers, 233 Post St.
Resing & McGuinness, 488 Pine St.
Martin Rist, Phelan Bldg.
Albert F. Roller, Crocker First Nat'l Bank Bldg.
William Henry Rowe, 127 Montgomery St.
N. W. Sexton, De Young Bldg.
Douglas Dacre Stone and Lou B. Mulloy, 381 Bush St.
Harry A. Thomsen, Jr., 315 Montgomery St.
William H. and Harold H. Weeks, 593 Market St.

Santa Barbara

E. Keith Lockard, 117 E. De la Guerra St.
Winsor Soule & John Frederic Murphy, 116 E. Sola St.

Santa Maria

Crawford and Davis, Gibson-Drexler Bldg.

Santa Paula

Roy C. Wilson, Box 951

Santa Rosa

C. A. Caulkins, Jr., Rosenberg Bldg.
William Herbert, Rosenberg Bldg.

Stockton

Elmore G. Ernst, 561 E. Harding Way
Frank V. Mayo & Eric Johnson, 931 N. Eldorado St.
Peter L. Sala, 2130 N. Commerce St.

Ventura

Harold E. Burket, 468 E. Main St.

Colorado

Boulder

G. H. Huntington, Box 52

Colorado Springs

Edward L. Bunts, First National Bank Bldg.
Charles E. Thomas, Colorado Springs National Bank Bldg.

Denver

Atchison & Emery, 1254 Monaco Pkwy.
J. B. Benedict, 1669 Broadway
T. H. Buell & Co., 730 14th St.
H. W. J. Edbrooke, Tabor Bldg.
Fisher, Fisher and Hubbell, Denver National Bldg.
Robert K. Fuller, Insurance Bldg.
Eugene G. Groves, Temple Court Bldg.
Burnham Hoyt, Colorado National Bank Bldg.
John K. Monroe, 2150 Curtis St.
Earl C. Morris, Midland Savings Bldg.
R. O. Parry, C. A. Johnson Bldg.
C. Francis Pillsbury, Midland Savings Bldg.
Gordon D. White, 615 Columbine St.

Grand Junction

J. Lewis Ford, 122 N. 6th St.

Greeley

F. W. Ireland, Jr., Colorado State College of Education

Pueblo

Walter DeMordaunt, Thatcher Bldg.
John Gray, Colorado Bldg.

Connecticut

Bridgeport

Frederick H. Beckwith, 19 Arcade Balcony

Danbury

Philip Nichols Sunderland, Inc., 81 West St.

Hartford

Golden, Storrs & Co., 343 Fairfield Ave.
Carl J. Malmfeldt, 36 Pearl St.
William T. Marchant, 36 Pearl St.
Frank Warren Whiton, 550 Main St.

Litchfield

Ernest Sibley

Meriden

Lorenzo Hamilton, 137 Colony St.

Middletown

Carl E. Segerberg, 57 Barbara Road
Towner and Lamb, 164 Court St.

New Britain

Frederic C. Teich, Maple Hill

New London

Payne & Keefe, Manwaring Bldg.

Waterbury

Louis A. Walsh, 111 W. Main St.

West Hartford

Russell F. Barker

Delaware

Wilmington

Walter Carlson, Delaware Trust Bldg.
Martin & Jeffers, Inc., DuPont Bldg.
Massena & DuPont, 704 Delaware Ave.
G. Morris Whiteside, 2nd, DuPont Bldg.

District of Columbia

Washington

Rhees E. Burket, 726 Jackson Pl.
Albert I. Cassell, 1903 14th St., N. W.
Faulkner & Kingsbury, 917 15th St.
Frederick V. Murphy, 1413 H St., N. W.
Upman & Adams, 808 17th St.
A. Hamilton Wilson, Frank G. Pierson, 1621 Connecticut Ave.
Nathan C. Wyeth, Municipal Architect, District Bldg.

Florida

Daytona Beach

Harry M. Griffin, 309 N. Grandview Ave.

Gainesville

Rudolph Weaver, Peabody Hall, University of Florida

Jacksonville

S. Ralph Fetner, 218 W. Church St.
Mellen C. Greeley, Barnett National Bank Bldg.
Olof Eskil Segerberg, Barnett National Bank Bldg.
Max L. Worthley, 605 Ocean St.

Lakeland

W. B. & Thomas V. Talley, Cochrane Bldg.

Miami

Kiehnel & Elliott, Seybold Bldg.

Miami Beach

August Geiger, 731 Lincoln Rd.

Ocala

Frank A. Parziale, Robertson Bldg.

Pensacola

S. J. Welch, 1306 E. Jackson St.

St. Petersburg

Archie G. Parish, Empire Bldg.
Henry L. Taylor, Empire Bldg.

Sarasota

J. H. Johnson, Box 147

Tallahassee

E. D. Fitchner, 650 E. College Ave.
James A. Stripling, State Department of Education

Tampa

Frank A. Winn, Jr., 416 Tampa St.

Georgia

Athens

Roy E. Hitchcock, Barrow Hall, University of Georgia

Atlanta

Alger & Wilhoit, Mortgage Guarantee Bldg.
W. Montgomery Anderson, Citizens & Southern Bank Bldg.
Harold Bush-Brown, Georgia School of Technology
Wm. J. J. Chase, 140 Peachtree St.
Daniell & Beutell, Ga. Savings Bank Bldg.
Edwards & Sayward, Palmer Bldg.
Ivey & Crook, Candler Bldg.
Henry H. Jordan, Healey Bldg.
R. Kennon Perry, Mortgage Guarantee Bldg.
Odis Clay Poundstone, Palmer Bldg.
Norman F. Stambaugh, Citizens & Southern National Bank Bldg.

Augusta

F. Arthur Hazard, Masonic Bldg.
Willis Irvin, S. F. C. Bldg.
Scroggs & Ewing, S. Finance Bldg.

Columbus

Biggers & Lockwood

Fitzgerald

Lauren Parrott, 408 E. Central Ave.

Macon

W. Elliott Dunwody, Jr.
Ellamae Ellis League

Savannah

Cletus W. Bergen, Liberty Bank Bldg.
Levy & Clarke, Liberty Bank Bldg.

Idaho

Boise

Tourtellotte & Hummel, Eastman Bldg.
Wayland & Fennell, Box 1277

Idaho Falls

L. E. Stalker, Jennie Rogers Bldg.

Nampa

Lee R. Cooke, 1220 1st St., S.

Pocatello

Frank H. Paradice, Jr., Dietrich Bldg.

Twin Falls

Burton E. Morse, Fidelity National Bank Bldg.

Illinois

Alton

James M. Maupin, Commercial Bldg.
L. Pfeiffenberger's Sons, 102 W. 3rd St.

Aurora

Frank B. Gray, 73 S. LaSalle St.

Belleville

Rubach & Weisenstein, Belleville National Bank Bldg.

Bloomington

Lundeen & Hilfinger, Corn Belt Bank Bldg.
Schaeffer & Hooton, Peoples Bank Bldg.

Champaign

F. E. Berger & R. L. Kelley, 44 Main St.
George E. Ramey & Co., Robeson Bldg.

Chicago

Alfred P. Allen & Maurice Webster, Assoc., 225 N. Michigan Ave.
Armstrong, Furst, and Tilton, 11 S. La Salle St.
Burnham & Hammond, Inc., 160 N. LaSalle St.
Childs & Smith, 430 N. Michigan Ave.
John C. Christensen, Board of Education, 228 N. LaSalle St.
John D. Chubb, 109 N. Dearborn St.
Granger & Bollenbacher, 333 N. Michigan Ave.

John Leonard Hamilton, 814 Tower Court
Albert Frederic Heino, 11059 Hale Ave.
Charles Hodgdon & Son, 111 W. Monroe St.
Holabird & Root, 333 N. Michigan Ave.
Holmes & Flinn, 8 S. Dearborn St.
C. I. Krajewski, 844 N. Rush St. (also at Dubuque, Iowa)
Godfrey E. Larson Inc., 77 W. Washington St.
Joseph C. Llewellyn Co., 38 S. Dearborn St.
Perkins, Wheeler & Will, 225 N. Michigan Ave.
James B. Rezny & Adrian Rezny, 2202 S. Crawford Ave.
E. E. Roberts and Elmer C. Roberts, Inc., 27 W. Washington St.
Monroe R. Sandel, 10 E. Huron St.
Tallmadge and Alderman, 19 E. Pearson St.

Danville
Liese, Ludwick, & Jones, Temple Bldg.

Decatur
S. A. Clausen, Standard Bldg.
F. E. Holmstrand, Decatur Club Bldg.

East St. Louis
Knoebel & Pabst, Spivey Bldg.

Elgin
Leroy W. Thompson, 735 St. John St.

Galesburg
Aldrich & Aldrich, Bondi Bldg.

Highland Park
John S. Van Bergen, 234 Cedar Ave.

Kewanee
John A. Scribbins, 125½ N. Tremont St.

Lake Forest
Anderson & Ticknor, Inc., 262 E. Deerpath Ave.

Lincoln
Deal & Deal, Box 406

Metropolis
S. Lester Daly

Moline
M. R. Beckstrom, Reliance Bldg.
William H. Schulzke, Fifth Avenue Bldg.

Mt. Vernon
McCoy and Wilson, First National Bank Bldg.

Murphysboro
R. Z. Gill & Co., 1328½ Walnut St.

Ottawa
Louis H. Gerding, 708 LaSalle St.

Park Ridge
W. F. McCaughey, Pickwick Bldg.

Peoria
Hewitt, Emerson & Gregg, Alliance Life Bldg.
Jameson & Harrison, Alliance Life Bldg.

Quincy
Martin J. Geise, 109 N. 8th St.

Rockford
Bradley & Bradley, 226 S. Main St.
Gilbert A. Johnson, 501 7th St.
Raymond A. Orput, Empire Bldg.

Rock Island
Cervin & Stuhr, Safety Bldg.
Benj. A. Horn, Rock Island Bank Bldg.

Springfield
Harry J. Reiger, Security Bldg.

Urbana
Royer & Danely, Lincoln Hotel Bldg.
Smith, Kratz & Strong, 101 S. Broadway
Ernest L. Stouffer, Administration Bldg.

Waukegan
Ekstrand & Schad, 118 N. Genesee St.

Indiana

Alexandria
Martin L. Burden

Anderson
E. F. Miller, Anderson Bank Bldg.
Ernest R. Watkins, Citizens Bank Bldg.

Bloomington
Norman H. Hill, Administration Bldg., Indiana University

Brazil
Wayne M. Weber, 123 Logan St.

Cicero
A. A. Faulstich, Box 110

Connersville
Henkel & Hanson, 715 Central Ave.

Crawfordsville
Carroll O. Beeson, Ben Hur Bldg.

Dana
H. L. Fillinger

East Chicago
Michael S. Bittner, 721 W. Chicago Ave.
C. I. Botteron, 4005 S. Main St.
Karl D. Norris

Evansville
Harry E. Boyle & Co.

Fort Wayne
Le Roy Bradley, 225 E. Berry St.
A. M. Strauss, Cal-Wayne Bldg.

Frankfort
Leonard & Wolf, 59 N. Jackson St.

Gary
Joe H. Wildermuth & Co., 527 Broadway

Hammond
L. Cosby Bernard & Co., 7241 Forest Ave.
W. S. Hutton, 5231 Hohman Ave.

Huntington
Robert W. Stevens, 1033 Cherry St.

Indianapolis
D. A. Bohlen & Son, Majestic Bldg.
Burns & James, Architects Bldg.
Robert Frost Daggett, 445 N. Pennsylvania St.
Graham & Knowlton, Security Trust Bldg.
McGuire & Shook, Fletcher Trust Bldg.
C. D. J. Zimmerman, Inc. & Associates, 3538 N. Meridian St.

Kentland
John A. Bruck

Lafayette
Walter Scholer, 1114 State St.

Logansport
Henry C. Wolf, 316 Heath St.

Lowell
M. Clifford Wiley, Clark & Main Sts.

Muncie
Houck & Hamilton, Patterson Bldg.
Geo. F. Schreiber, 1003 University Ave.
H. F. Smenner & Associates, 108 E. Washington St.

New Albany
Hawkins & Walker, Elsby Bldg.

Richmond
Werking & Son, 2000 E. Main St.

South Bend
Austin & Shambleau, J. M. S. Bldg.
Willard M. Ellwood, Christman Bldg.
Maurer & Maurer, 107 Lincoln Way, E.
Callix E. Miller, Union Trust Bldg.
Ernest W. Young, Sherland Bldg.

Terre Haute
Miller & Yeager, Opera House Bldg.

Vincennes
Lester W. Routt, Citizens Trust Bldg.

Iowa

Ames
Allen Holmes Kimball, 213 Engineering Annex, Iowa State College

Burlington
Robin B. Carswell, F. & M. Bank Bldg.

Cedar Rapids
Mark Anthony, O.R.C. Bldg.
W. J. Brown, Higley Bldg.
Norman Hatton, Higley Bldg.
Chas. B. Zalesky, Mer. Nat'l Bank Bldg.

Council Bluffs
J. Chris Jensen, 305 Broadway

Davenport
Arthur H. Eberling, Kahl Bldg.
Kruse & Parish, Kahl Bldg.
Howard S. Muesse, Davenport Bank Bldg.
Seth J. Temple, Union Bank Bldg.

Decorah
Charles Altfillisch, 126½ W. Water St.

Des Moines
Dougher, Rich & Woodburn, Old Colony Bldg.
Keffer & Jones, Masonic Temple.
Proudfoot, Rawson, Brooks & Borg, Hubbell Bldg.
Oren Thomas, Des Moines Bldg.
Tinsley, McBroom & Higgins, Hubbell Bldg.

Forest City
Thorwald Thorson

Fort Dodge
E. O. Damon, East Mason Bldg.
Frank W. Griffith, Snell Bldg.

Iowa City
Geo. L. Horner, State University of Iowa

Mason City
Hansen & Waggoner

Sioux City
Beuttler & Arnold, Insurance Exchange Bldg.
E. R. Swanson, Insurance Exchange Bldg.

Waterloo
M. B. Cleveland, 424 E. 4th St.

Kansas

Abilene
Murray & Cayton, Citizens Bank Bldg.

Arkansas City
Arthur L. Games, Howard Bldg.

Chanute
Wolpert & Newcomb, Mercantile Bldg.

Clay Center
Hal Wheelock, 1405 Fifth St.

Emporia
Brinkman & Hagan, Citizens Bank Bldg.
A. E. Buck, Emporia State Bank
W. F. Marx, 715 Commercial St.

Hutchinson
Harold T. English, Nelson Bldg.
McCrackin and Hiett, 308 W. 20th St.
Mann & Co., Wiley Bldg.

Kansas City
Jos. W. Radotinsky, Commercial National Bank Bldg.

Ottawa
C. A. Washburn, 220½ Main St.

Salina
Ben H. Byrnes, Nat'l Bank of America Bldg.
Chas. W. Shaver, United Life Bldg.

Topeka
Cuthbert & Suehrk, 735 Kansas Ave.
W. E. Glover, National Reserve Bldg.
Ralph E. Scamell, National Reserve Bldg.
Louis H. Spencer, Central Bldg.
Thos. W. Williamson & Co., National Bank of Topeka Bldg.

Wichita
Ed. Forsblom, Beacon Bldg.
Clarence C. Robinson, 540 S. Madison St.
Lorentz Schmidt, 1832 E. 2nd St.
Glen H. Thomas, 125½ N. Topeka Ave.

Kentucky

Ashland
H. Clell Hayes, 515 16th St.

Bowling Green
J. M. Ingram, 919 Park St.

Covington
Chester H. Disque, 1212 Highway St.
Abner E. Foster, Coppin Bldg.
B. T. Wisenall, First National Bank Bldg.

Frankfort
C. Julian Oberwath, 301 W. 2nd St.

Harlan
D. E. Perkins, First St.

Hazard
H. A. Spalding, Baker Bldg.

Hopkinsville
John T. Waller, 1700 S. Virginia St.

Lexington
Wm. B. Brock, II, Radio Bldg.
H. A. Churchill & Associates, Citizens Bank Bldg.
Frankel & Curtis, McClelland Bldg.
John T. Gillig, Radio Bldg.
Hugh Meriwether, Radio Bldg.
John F. Wilson, 131 W. Short St.

Louisville
E. T. Hutchings, Heyburn Bldg.
Joseph & Joseph, Breslin Bldg.
D. X. Murphy & Bro., Louisville Trust Bldg.
Otis & Lea, Starks Bldg.
Arthur G. Tafel, 140 S. 3rd St.

Owensboro
Walter Scott Roberts, 115 E. 4th St.

Louisiana

Alexandria
C. Errol Barron, Guaranty Bank Bldg.
Herman J. Duncan & Co., Inc., Rapides Bank Bldg.
Max J. Heinberg, Weil Bldg.
Charles T. Roberts, Guaranty Bank Bldg.

Baton Rouge
Bodman & Murrell, Reymond Bldg.
Robert H. Goodman, Wieck Bldg.
Geo. A. Thompson and C. L. Olschner, 424 State St.

Lafayette
Favrot & Reed & Frederick J. Nehrbass, Edgewood Terrace

Metairie Ridge
Ada Arnold Langridge, 215 Lake Ave.

Monroe
H. H. Land
J. W. Smith & Associates, Ouachita National Bank Bldg.

New Orleans
William R. Burk, Balter Bldg.
Edgar A. Christy, Orleans Parish School Board, 703 Carondelet St.
Diboll, Kessels & Associates, Baronne Bldg.
Favrot & Reed, Nola Bldg.
Moise H. Goldstein & Associates, American Bank Bldg.
William T. Nolan, Queen & Crescent Bldg.
Allison Owen, Canal Bank Bldg.
Theo. L. Perrier, Balter Bldg.
Weiss, Dreyfous & Seiferth, Maison Blanche Bldg.
Wogan & Bernard, Baronne Bldg.

Shreveport
Jones, Roessle, Olschner & Wiener, Ardis Bldg.
Edward F. Neild, City Bank Bldg.
J. Cheshire Peyton, Giddens Lane Bldg.

University
Frederick V. von Osthoff

Maine

Augusta
Bunker & Savage, 256 Water St.

Bangor
Crowell & Lancaster, 6 State St.

Portland
Miller & Beal, Inc., 465 Congress St.

Presque Isle
John C. Levasseur, 311 N. Main St

Maryland

Baltimore
O. Eugene Adams, 329 N. Charles St.
Buckler & Fenhagen, 325 N. Charles St.
Wm. W. Emmart, Munsey Bldg.
Clyde N. & Nelson Friz, Lexington Bldg.
Lucien E. D. Gaudreau, 527 N. Charles St.
Henry Powell Hopkins, 10 E. Mulberry St.
Frederick L. W. Moehle & Associates, 409 N. Charles St.
Mottu & White, 2127 N. Charles St.
Henry G. Perring Co., 10 W. Chase St.
Taylor & Fisher, 1012 N. Calvert St.
Lucius R. White, Jr., 10 W. Chase St.

Cumberland
Robert Holt Hitchins, 108 Washington St.

Hagerstown
A. J. Klinkhart

Salisbury
Edwin Wilson Booth, Market St.
Malone & Williams

Silver Spring
Howard Cutler & Katherine Cutler, 8501 Dale Drive
Stanley W. Hahn, 1511 East-West Highway
Donald S. Johnson,
Laurence P. Johnston

Takoma Park
Ronald Senseman, 142 Carroll Ave.

Massachusetts

Boston
Allen, Collens, & Willis, 75 Newbury St.
Andrews, Jones, Biscoe & Whitmore, 50 Congress St.
Appleton & Stearns, 53 State St.
J. Williams Beal, Sons, 185 Devonshire St.
Coolidge & Carlson, 89 State St.
Coolidge, Shepley, Bulfinch & Abbott, Ames Bldg.
Frank Irving Cooper Corp., 20 Kilby St.
Cram & Ferguson, 248 Boylston St.
Desmond & Lord, 1 Beacon St.
Ralph Harrington Doane, 7 Water St.
Office of Edwin S. Dodge, 50 Beacon St.
Wm. W. Drummey & Co., 168 Dartmouth St.
M. A. Dyer Co., 1 Beacon St.
John M. Gray Co., 175 High St.
Henry & Richmond, 177 State St.
Hutchins & French, 11 Beacon St.
Kilham, Hopkins & Greeley, 126 Newbury St.
Edmund I. Leeds, 5 Park Sq.
McLaughlin & Burr, 88 Tremont St.
Maginnis & Walsh, Statler Bldg.
Markus & Nocka, 184 Boylston St.
Perry, Shaw & Hepburn, 141 Milk St.
Isidor Richmond, 248 Boylston St.
Louis Warren Ross, 9 Park St.
Sturgis Associates, 120 Boylston St.
Oscar A. Thayer, 171 Newbury St.

Fall River
Israel T. Almy, 56 N. Main St.
Edward M. Corbett, 49 Purchase St.

Fitchburg
S. W. Haynes & Associates, 336 Main St.

Greenfield
James A. Britton, 78 Federal St.

Haverhill
Morse, Dickinson & Goodwin, 25 Washington Sq.

Lawrence
Ashton & Huntress, 477 Essex St.

Leominster
Harold E. Mason, 15 Prospect St.

Lowell
Harry Prescott Graves, 40 Middlesex St.
Henry L. Rourke, Hildreth Bldg.

Lynn
George A. Cornet, 14 Central Ave.

Northampton
Frank Mark Mahoney, 199 Main St.

Springfield
Gardner & King, 33 Lyman St.
Morris W. Maloney, 220 Dwight St.

Wellesley
Wm. B. Colleary, RR. 4

Worcester
Lucius W. Briggs Co., 90 Park Ave.
Howard Frost, 14 Norton St.
O. E. Nault & Sons, 48 Hamilton St.

Michigan

Ann Arbor
Fry & Kasurin, First National Bank Bldg.

Battle Creek
Lewis J. Sarvis, Bailey Bldg.

Bay City
Joseph C. Goddeyne, Bay City Bank Bldg.

Birmingham
J. Robert F. Swanson, Wabeek Bldg.

Dearborn
Bennett & Straight, Schaefer Bldg.
Harry C. Vicary, 22148 Michigan Ave.

Detroit
Derrick & Gamber, Inc., Union Guardian Bldg.
J. Ivan Dise, 2631 Woodward Ave.
Donaldson & Meier, Washington Blvd. Bldg.
C. R. Jensen, 3757 Gladstone Ave.
Lyndon & Smith, 13700 Woodward St.
McGrath & Dohmen, 3648 Mt. Elliott Ave.
Malcolmson, Calder & Hammond, Inc., 1217 Griswold St.
Merritt & Cole, 1111 Collingwood Ave.
O'Dell & Rowland, Marquette Bldg.
C. William Palmer, 243 W. Congress St.
George L. W. Schuls, Board of Education, 1354 Broadway
Smith, Hinchman & Grylls, Inc., Marquette Bldg.
N. Chester Sorensen Co., Industrial Bank Bldg.
B. C. Wetzel & Co., Dime Bank Bldg.

Flint
Geo. J. Bachmann, Dryden Bldg.
Ralph T. Dittmer, Sherman Bldg.

Grand Rapids
Roger Allen, Grand Rapids National Bank Bldg.
Knecht, McCarty & Thebaud, Inc., Watson Bldg.

Iron Mountain
F. E. & G. F. Parmelee, Box 346

Ironwood
N. Albert Nelson, 106 Suffolk St.

Jackson
Frost & Snyder, 407 S. Jackson St.

Kalamazoo
LeRoy & Newlander, Pratt Bldg.
Stewart-Kingscott Co., 208 Elm St.

Lansing
Lee Black & Kenneth C. Black, Capitol Savings & Loan Bldg.
Bowd-Munson Company, Inc., Wilson Bldg.
Herrick & Simpson, Bauch Bldg.
Warren S. Holmes Co., Olds Tower Bldg.

Marquette
David E. Anderson, 301 Nester Blk.

Menominee
Derrick Hubert, 1065 Sheridan Rd.

Plymouth
George J. Haas, 243 N. Main St.

Port Huron
Walter H. Wyeth, Peoples Bank Bldg.

Royal Oak
Frederick D. Madison, Inc., Washington Sq. Bldg.
Worden & Price, Washington Sq. Bldg.

Saginaw
Samuel C. Allen, Eddy Bldg.
Frederick Beckbissinger, 304 Carroll St.
Robert Frantz and James B. Spence, 118 N. Washington St.

St. Johns
R. V. Gay, 1½ Clinton Ave.

Traverse City
Ralph L. Bauer, State Bank Bldg.

Ypsilanti
R. S. Gerganoff, 206 N. Washington St.

Minnesota

Albert Lea
LeRoy Gaarder. Home Investment Bldg.

Austin
Allen H. Meinecke, 2129 N. Main St.

Duluth
E. F. Broomhall, Box 472
Erickson & Co., Alworth Bldg.
Thomas J. Shefchik, Glencoe Bldg.
C. H. Smith, Torrey Bldg.

Eveleth
Elwin H. Berg, 721 Summit St.

Fergus Falls
E. O. Broaten, Schacht Bldg.
Foss & Co.

Hibbing
J. C. Taylor, 902 Minn. St.

Mankato
Pass & Rockey, 122½ E. Jackson St.
Ernest H. Schmidt & Co.

Minneapolis
E. B. Croft, 1004 Marquette Ave.
Walter Dennis, 512 Nicollet Ave.
E. H. Enger, Board of Education, 811 N. E. Broadway St.
Nairne W. Fisher, 3121 Excelsior Blvd.
Haxby & Bissell, 1111 Nicollet Ave.
Jacobson & Jacobson, Sexton Bldg.
B. J. Knowles, Walker Bldg.
Larson & McLaren, Foshay Tower
Pesek & Shifflet, 914 Marquette Ave.
Edmund J. Prondzinski, Pence Bldg.

New Ulm
Albert G. Plagens

St. Cloud
Frank W. Jackson, 513½ St. Germain St.
Louis C. Pinault

St. Paul
William L. Alban, Endicott Bldg.
P. C. Bettenburg & Co., 1437 Marshall Ave.
Buechner & Orth, 1437 Marshall Ave.
Carl H. Buetow, 570 N. Snelling Ave.
Eugene D. Corwin, Guardian Bldg.
Ellerbe & Co., First National Bank Bldg.
Ray R. Gauger & Co., New York Bldg.
Hausler & Fridlund, 490 N. Snelling St.
William M. Ingemann, Anchor Bldg.
Clarence H. Johnston, Empire Bank Bldg.
Eugene V. Schaefer, Shubert Bldg.
Slifer & Cone, Endicott Bldg.
Toltz, King & Day, Inc., Pioneer Bldg.

Thief River Falls
Henry C. Eckland & Co.

Virginia
Paul S. Damberg, 212 Chestnut St.

Winona
Boyum, Schubert & Sorensen (also in La Crosse, Wis.)

Mississippi

Biloxi
John T. Collins, Olivari Bldg.

Greenwood
R. J. Moor, Box 507

Gulfport
Shaw & Woleben, M. Salloum Bldg.

Hattiesburg
Landry & Matthes

Jackson
Hull & Drummond. Merchants Bank Bldg.
E. L. Malvaney, Millsaps Bldg.
R. W. Naef, 411½ E. Capitol St.
N. W. Overstreet, Standard Life Bldg.
James M. Spain, Deposit Guaranty Bldg.

Meridian
Krouse & Brasfield, Kidder Bldg.

Starkville
Stevens & Johnston, Walker Bldg.

Missouri

Chillicothe
R. Warren Roberts, Court House

Clayton
Hal. Lynch, 304 N. Central Ave.

Jefferson City
Besecke, Swanson & Terney, 314 Jefferson St. (also in Kansas City, Mo.)
John M. Schaper, 1825 W. Main St.

Kansas City
Besecke, Swanson & Terney, Reliance Bldg. (also in Jefferson City, Mo.)
Samuel W. Bihr, Jr., 912 Baltimore St.
Carroll & Dean, R. A. Long Bldg.
Felt & Kriehn, 4638 Mill Creek Pkwy.
Edward M. Fuller, 1012 Baltimore Ave.
Hardy & Schumacher, Scarritt Arcade
Frederick C. Gunn, National Fidelity Life Bldg.
Keene & Simpson, 15 W. 10th st.
Marshall & Brown, 114 W. 10th St.
H. D. Pampel, Finance Bldg.
Sayler & Owen, 1207 Grand Ave.
Joseph B. Shaughnessy, Reliance Bldg.
Chas. A. Smith, 1009 Baltimore Ave.

Moberly
Ludwig Abt

St. Joseph
Walter Boschen, 517½ Francis St.
Eckel & Aldrich, Corby Bldg.
Everett Johns, 720½ Felix St.
Eugene R. Meier, Bartlett Bldg.
Webb Siemens, Central Bldg.

St. Louis
Macon A. Abbitt, 315 N. 7th St.
Bonsack & Pearce, Inc., 408 Olive St.
Marcel Boulicault, Ambassador Bldg
Ernest T. Friton, Security Bldg.
Henry P. Hess, 411 N. 7th St.
Wm. B. Ittner, Inc., 911 Locust St.
Jamieson & Spearl, Arcade Bldg.
La Beaume & Klein, 315 N. 7th St.
O'Meara & Hills, G. E. Quick Associate, 5709 Waterman Blvd.
G. W. Sanger, Commissioner of School Buildings, 911 Locust St.
O. W. Stiegemeyer, 4412 Lindell Blvd.
Study & Farrar, Arcade Bldg.

Springfield
Bruce Granger, Woodruff Bldg.
Robert W. Engel, 1311 Cairo St.
Dan R. Sandford, Woodruff Bldg.

Montana

Billings
Chandler C. Cohagen, Hedden Bldg.
Cushing & Terrell, Box 1776
J. G. Link & Co., Electric Bldg.
Edwin G. Osness, 2714 10th Ave., N.
William H. Reid, Jr., 1140 N. 30th St.

Bozeman
Fred F. Willson, Box 497

Butte
Walter Arnold, 1232 W. Granite St.

Great Falls
Cottier & Herrington, First National Bank Bldg.
George H. Shanley
J. van Teylingen, Medical Arts Bldg.

Havre
Frank F. Bossuot, 133 4th Ave.

Helena
Hugenin & De Kay, 440 N. Benton Ave.

Kalispell
Fred A. Brinkman, Whipps Block

Missoula
H. E. Kirkemo, Lehsou Block

Nebraska

Fremont
George Grabe, 304 E. 6th St.

Grand Island
Gordon Shattuck, Clinic Bldg.

Hastings
K. H. Gedney Co.

Kearney
John P. Helleberg, 2302 Central Ave.
McClure & Walker, 2111½ Central Ave.

Lincoln
Fritz Craig, Stuart Bldg.
Davis & Wilson, Stuart Bldg.
Meginnis & Schaumberg, Federal Securities Bldg.
J. F. Reynolds, 1637 S. 11th St.

North Platte
C. C. Coursey, 517½ Dewey St.

Omaha
M. R. Brigham, 5404 Western Ave.
Everett S. Dodds, 6601 Florence Blvd.
Kimball, Steele & Sandham, 2236 St. Mary's Ave.
Lahr & Stangel, W. O. W. Bldg.
John Latenser & Sons, Inc., 1307 Farnham St.
John & Alan McDonald, Standard Oil Bldg.
Chas. W. Steinbaugh, Brandeis Theatre Bldg.

Scottsbluff
O. J. Hehnke, Box 516.

Nevada

Reno
DeLongchamps & O'Brien, Gazette Bldg.
Russell Mills, 309 N. Virginia St.

New Hampshire

Durham
E. T. Huddleston, University of New Hampshire

Hanover
Jens Frederick Larson.
Wells, Hudson & Granger, Main St.

New Jersey

Camden
Joseph Norman Hettel, 720 Federal St.
F. Herbert Radey, 101 N. 7th St.

Cliffside Park
Lucht & Anderson, 432 Palisade Ave.

Elizabeth
Leslie M. Dennis, 333 N. Broad St.
C. Godfrey Poggi, 287 Morris Ave.

Englewood
Lawrence C. Licht, 101 W. Palisade Ave.

Fort Lee
Hacker & Hacker, Fort Lee Trust Bldg.

Hackensack
Arthur E. Doré, 332 River St.
George Nordham, City National Bank Bldg.

Highland Park
John B. Richards, 309 Grant Ave.

Hillside
Jacob Wind, Jr., 1444 Broad St.

Irvington
Victor H. Strombach, 1243 Springfield Ave.

Jersey City
Hugh A. Kelly and Associates, 921 Bergen Ave. (also in Trenton)

Morristown
Walter Slifer, 10 Park Place

Newark
Behee & Krahmer, 27 Washington St.
J. Frederick Cook, 9 Clinton St.
Guilbert & Betelle, Chamber of Commerce Bldg.

New Brunswick
Alexander Merchant & Son, 1 Elm Row

Ocean City
Frederick F. Mills, 801 Asbury Ave.

Passaic
John P. Kelly, 157 Prospect St.

Paterson
Fanning & Shaw, 49 Ward St.
Lee & Hewitt, 152 Market St.

Perth Amboy
Aylin Pierson, 313 State St.

Plainfield
Alfred M. Korff, 203 Park Ave.
Ernest Thornell Brown, 201 E. 5th St.

Ridgefield
Thomas Watson, 569 Prospect Ave.

Teaneck
B. Francis McGuire, 705 Linden Ave.

Toms River
J. G. Phillips, 509 Main St.

Trenton
Louis S. Kaplan, 33 W. State St.
Hugh A. Kelly and Associates, 219 E. Hanover St. (also in Jersey City)
Herman L. Mack, 219 E. Hanover St.

Union
Frederick A. Elsasser, 1000 Stuyvesant Ave.
McMurray & Schmidlin, 982 Stuyvesant Ave.

West New York
Wm. Mayer, Jr., 585 Bergenline Ave.

New Mexico

Albuquerque
Brittelle & Ginner, K. of P. Bldg.
Louis G. Hesselden, 403 N. 12th St.

Clovis
Robert E. Merrell, Box 852

Roswell
Carr & Gardner, 204½ N. Main St.

Santa Fe
Kruger & Clark, Box 1587
John Gaw Meem & Hugo Zehner, Associates, Box 628
Gordon F. Street, El Torreon Bldg.

Silver City
E. M. Kolben, Box 632

New York

Albany
Andrew L. Delehanty, 450 Ontario St.
H. O. Fullerton, 152 Washington Ave.
Gander, Gander & Gander, 17 Steuben St.
Galen Nichols, 93 State St.
Office of Walter P. R. Pember, 24 James St.
J. Russell White, 109 State St.

Amsterdam
Howard F. Daly, 15 E. Main St.

Auburn
Wallace P. Beardsley, Seward Block

Binghamton
Conrad & Cummings, 99 Collier St.
A. T. Lacey & Sons, 52 Exchange St.
Walter H. Whitlock, 609 Chenango St.,

Brooklyn
Eric Kebbon, Supt. of School Bldgs., New York City, 49 Flatbush Ave. Extension
Henry V. Murphy, 1 Hanson Pl.

Buffalo
Bley & Lyman, 505 Delaware Ave.
Fronczak & Whitman, Court St. Bldg.
Paul H. Harbach & James W. Kideney, 505 Franklin St.
Albert H. Hopkins, Liberty Bank Bldg.
F. J. & W. A. Kidd, 524 Franklin St.
Daniel G. McNeil, 333 North Dr.
Charles E. Mott, 360 Delaware Ave.
Chester Oakley, 117 W. Tupper St.
Roswell E. Pfohl, 187 Niagara St.
Carl Schmill & Son, Prudential Bldg.

Cortland
Carl W. Clark

Elmira
Robert Turner Bickford, 215 W. Water St.
Haskell & Considine, Hulett Bldg.

Fayetteville
Gordon Wright, 315 E. Genesee St.

Gloversville
W. Brown Van Dreser, 31 W. Fulton St.

Harrison
Robert P. Vignola, 231 Harrison Ave.

Herkimer
R. E. Sluyter, 203 N. Washington St.

Ithaca
Arthur N. Gibb, 302 E. State St.

Jamestown
Raymond A. Freeburg, 1105 W. 3rd St.

Middletown
Robert R. Graham, 25 Prospect St.
E. P. Valkenburgh

New York
Adams & Prentice, 15 W. 38th St.
Grosvenor Atterbury, 139 E. 53rd St.
Wesley Sherwood Bessell, 16 E. 52nd St.
William J. Boegel, 516 5th Ave.
Clarence Wilson Brazer, 415 Lexington Ave.
Alfred Busselle, 347 Madison Ave.
Cameron Clark, 101 Park Ave.
Coffin & Coffin, 125 E. 46th St.
Corbett & MacMurray, 130 W. 42nd St.
Crow, Lewis & Wick, 200 5th Ave.
Delano & Aldrich, 126 E. 38th St.
Randolph Evans, 140 Nassau St.
Evans, Moore & Woodridge, 101 Park Ave.
William Gehron, 101 Park Ave.
Archibald F. Gilbert, 358 5th Ave.
Gass Gilbert, Inc., 342 Madison Ave.
Alfred Morten Githens and Francis Keally, 101 Park Ave.
W. K. Harrison & J. A. Fouilhoux, 30 Rockefeller Plaza
William E. Haugaard, Commissioner, of Architecture, 80 Centre St.
Edward Shephard Hewitt, 32 E. 57th St.
Thomas H. Irving, 15 Park Row
A. H. Knappe & Associates, 192 Lexington Ave.
Archibald G. Lamont, 156 5th Ave.
William Lescaze, 211 E. 48th St.
McKim, Mead & White, 101 Park Ave.
Frederick Mathesius, 101 Park Ave.
Daniel D. Merrill, 11 E. 44th St.
Moore & Hutchins, 11 East 44th St.
Frank J. & Sylvester W. A. Murphy, 280 W. 246th St.
Robert J. Reiley, 62 W. 45th St.
James Gamble Rogers, Inc., 156 E. 46th St.
Rossiter & Muller, 22 E. 40th St.
Shreve, Lamb & Harmon, 11 E. 44th St.
Starrett & Van Vleck, 267 5th Ave.
Stearns & Stanton, 160 5th Ave.
Tooker & Marsh, 101 Park Ave.
Theodore Visscher & James Burley, 51 E. 42nd St.
Franklin B. Ware, 1170 Broadway
Harold G. Webb, 101 Park Ave.
Wilson & Rahm, 140 E. 39th St.
York & Sawyer, 100 E. 42nd St.

North Tonawanda
Louis F. Eggert, 35 Elmwood Ave.

Olean
A. W. E. Schoenberg, First National Bank Bldg.

Plattsburg
Alvin W. Inman, 71 Clinton St.

Poughkeepsie
Don P. Emley, 49 Market St.

Richfield Springs
Myron A. Jordan, Main St.

Rochester
Lewis J. Brew, 42 East Ave.
Charles A. Carpenter, Genesee Valley Trust Bldg.
Dryer & Dryer, 2550 East Ave.
William G. Kaelber and L. A. Waasdorp, 311 Alexander St.
George F. Lorenz, 3086 St. Paul Blvd.
Francis R. Scherer, 13 S. Fitzhugh St.
Smith & Stickney, 154 East Ave.

Rome
F. W. & Samuel N. Kirkland, American Block

Southampton
Wm. I. LaFon, Jr., 48 Main St.

Syracuse
Melvin L. & Harry A. King, Denison Bldg.
Randall & Vedder, 206 E. Genesee St.
D. Kenneth Sargent, Starrett-Syracuse Bldg.

Utica
Bagg & Newkirk, 258 Genesee St.
Edward J. Berg, 704 Washington St.

Valley Stream
Frederic P. Wiedersum, 240 Rockaway Ave.

Watertown
Office of D. D. Kieff, C. of C. Bldg.

West Hempstead
W. H. Spaulding, 22 Stevens Ave.

Westport
Quentin F. Haig

North Carolina

Asheville
Henry Irven Gaines, Public Service Bldg.
Lindsey M. Gudger, 52 Carter St.

Belmont
F. Michael McInerney, Belmont Abbey

Charlotte
Louis H. Asbury, Commercial Bank Bldg.
Walter W. Hook, Commercial Bldg.

Durham
Atwood & Weeks, Inc., Southern Fire Bldg.
George Watts Carr, 111 Corcoran St.

Elkin
J. M. Franklin, Box 28

Goldsboro
A. J. Maxwell, Jr., Borden Bldg.

Greensboro
W. L. Brewer, Dixie Bldg.
Charles C. Hartman, Jefferson Bldg.
Leon McMinn, Piedmont Bldg.
J. Burton Wilder, Banner Bldg.
Albert C. Woodroof, Jefferson Bldg.

Henderson
Eric G. Flannagan

Hendersonville
Erle G. Stillwell, Inc., Box 1056

Hickory
Robt. L. Clemmer, Grant Bldg.
Q. E. Herman, Harris Arcade

High Point
Louis F. Voorhees & Eccles D. Everhart

Leaksville
James W. Hopper, 234 W. Washington St.

Lenoir
Clarence P. Coffey, Box 368

Louisburg
M. Stuart Davis

Monroe
I. J. Tucker, Box 413

Raleigh
Wm. Henley Deitrick, 115 W. Morgan St.
Ross Shumaker, Box 5445
Frank B. Simpson, Shepherd Bldg.

Rocky Mount
Harry J. Harles, Municipal Bldg.

Shelby
V. W. Breeze

Wilmington
Leslie N. Boney, Murchison Bldg.

Wilson
Chas. C. Benton & Son
Frank W. Benton, Municipal Bldg.
Thomas B. Herman

Winston Salem
Harold Macklin, 620½ W. 4th St.
Northup & O'Brien, Reynolds Bldg.
William Roy Wallace, Reynolds Bldg.

North Dakota

Bismarck
Nick Ressler, 815 Front St. (also at Mandon)
Ritterbush Bros., 209 N. 7th St.

Fargo
Braseth & Houkom, Black Bldg.
William F. Kurke, 1117 13th Ave., N.

Grand Forks
Theodore B. Wells, 1006 Chestnut St.

Jamestown
Gilbert R. Horton, Box 1217

Mandon
Nick Ressler, 211 2nd Ave., N. E. (also at Bismarck)

Minot
G. H. Bugenhagen
E. W. Molander, First Avenue Bldg.

Ohio

Akron
Milton C. Murphy, Board of Education, 70 N. Broadway
Henry & Murphy, 247 E. Exchange St.
William Boyd Huff, 34 S. High St.
M. P. Lauer, 31 N. Summit St.

Athens
Wm. J. Davis, Jr., Security Bank Bldg.

Berea
Mellenbrook, Foley & Scott, 26 Front St.

Bucyrus
William Unger, Box 545

Canton
Office of Charles E. Firestone, 1412 Cleveland Ave.
Harry C. Frank, Canton Bldg.

Chagrin Falls
D. M. Allison, 19 N. Franklin St.

Cincinnati
Charles Frederick Cellarius, St. Paul Bldg.
Grunkemeyer & Sullivan, 3717 Eastern Ave.
E. C. & G. T. Landberg, 114 Garfield Pl.
Potter, Tyler & Martin, 35 East Seventh St.

Cleveland
Walter G. Caldwell, Engineers Bldg.
Junior W. Everhard, 9219 Clifton Blvd.
Fox & Duthie, Union Commerce Bldg.
Harry A. Fulton, 5716 Euclid Ave.
James William Thomas, 3868 Carnegie Ave.
Warner & Mitchell, Bulkley Bldg.

Columbus
E. W. Austin, 17 S. High St.
Fred Fornoff, 55 E. State St.
F. F. Glass, 20 S. 3rd St.
Harsh & Davies, 145 N. High St.
R. C. Kempton, 50 W. Broad St.
Edward Kromer, Board of Education, 270 E. State St.
Richards, McCarty & Bulford, 584 E. Broad St.
John P. Schooly, State Architect, State Office Bldg.
Howard Dwight Smith, Ohio State University

Coshocton
Fred D. Jacobs, 514 Main St.

Dayton
Rial T. Parish, 127 Cambridge Ave.
Walter A. Rabold, 341 Elmhurst Rd.
Walker, Norwick & Templin, American Bldg.

East Liverpool
Robert F. Beatty, Potters Savings & Loan Bldg.

Forest
Burk & Seebach, Warner St.

Fremont
C. H. Shively, 400½ Croghan St.

Grand Rapids
W. Howard Manor, E. Main St.

Hillsboro
Henry R. Ervin, 114 N. High St.

Lancaster
Ralph E. Crook

Lima
Peter M. Hulsken, Lyman T. Strong, Associates, 218 W. Market St.
Thomas D. McLaughlin & Associates, Dominion Bldg.

Mansfield
Althouse & Jones, Farmers Bank Bldg.
Harry J. Brumenshenkel, 13 Park Ave., W.
Vernon Redding & Associates, Walpark Bldg.

Massillon
Albrecht & Wilhelm, McClymonds Bldg.

Nelsonville
William Mills & Son, Citizens Central Bank

New Philadelphia
Charles J. Marr, N. Broadway

Norwalk
Granville E. Scott, Citizens Bank Bldg.

Sandusky
Harold Parker, 230 E. Market St.

Sidney
F. E. Freytag, Orbison Hill

Springfield
Eastman & Harman, 2 W. Columbia St.

Steubenville
Fred H. Clarke

Tiffin
Lynn Troxel, Laird Bldg.

Toledo
Britsch & Munger, Nicholas Bldg.
Edwin M. Gee, Board of Education
Gerow & Conklin, Spitzer Bldg.
Jokel-Coy-Thal, 320 Ontario St.
Mills, Rhines, Bellman & Nordhoff, Inc., 518 Jefferson Ave.

Warren
Roy T. Campbell, 11 Elec. Block
Keich & O'Brien, Union Bank Bldg.

Wooster
R. A. Curry, 127½ E. Liberty St.

Youngstown
Myron N. Goodwin, Union National Bank Bldg.
O. J. Kling, 100 E. Rayen Ave.
Randall Medicus, Home Savings & Loan Bldg.
M. Gilbert Miller, 12 W. Madison Ave.
Charles F. Owsley, 211 N. Champion St.
Arsene A. Rousseau, Mahoning Bank Bldg.
Frank F. Smith, 2514 Market St.

Oklahoma

Ada
Robert F. Ferguson, Box 702
Albert S. Ross, Cummings Bldg.

Ardmore
J. B. White, Gilbert Bldg.

Bartlesville
Arthur Gorman, 301½ Johnstone Ave.

Chickasha
Paul Harris, 1503 S. 19th St.

Enid
George Blumenauer, Stephenson Bldg.
R. W. Shaw, Bass Bldg.

Kingfisher
Henry C. Jackson, Box 394

Muskogee
J. J. Haralson, Manhattan Bldg.
H. H. Niemann, 1155 Summit St.

Norman
Joe E. Smay, University of Oklahoma

Oklahoma City
Leonard H. Bailey, Colcord Bldg.
Forrest Butler, Terminal Bldg.
Jos. I. Davis, 6631 Avondale Ave.
Dennis E. Donovan, 101 E. 3rd St.
Malcolm Moore, Cotton Exchange Bldg.
Sorey, Hill & Sorey, First National Bldg.
Tonini & Bramblet, Cotton Exchange Bldg.
Walter T. Vahlberg, Hightower Bldg.
Winkler & Reid, Oklahoma Savings Bldg.

Ponca City
G. J. Cannon, Community Bldg.

Shawnee
Hugh W. Brown, Jr., Petroleum Bldg.
A. C. Davis & Sons, 432 N. Broadway

Stillwater
Philip A. Wilber, 315 Knoblock St.

Tulsa
A. M. Atkinson, Thompson Bldg.
Ralph M. Black, Kennedy Bldg.
John O. Bradley & Co., Inc., Robinson Bldg.
John Duncan Forsyth, 115 E. 18th St.
Koberling & Fleming, 1400 S. Boston Ave.

A. J. Love & Co., Atco Bldg.
Malcolm McCune, 1308 S. Utica St.
Leon B. Senter, Philtower Bldg.
A. Thomson C. Thorne, 1643 S. Florence Pl.
Frank C. Walter, Midco Bldg.

Oregon

Eugene
John Laurin Reynolds, 841 Willamette St.
Graham B. Smith, Register-Guard Bldg.

Klamath Falls
Howard R. Perrin, Underwood Bldg.

Medford
William Laing, U. S. National Bank Bldg.

Portland
J. D. Annand, 512 N. W. 12th Ave.
Barrett & Logan, 1940 S. W. 4th Ave.
John V. Bennes, Lewis Bldg.
A. E. Doyle & Associates, Pacific Bldg.
C. N. Freeman, Postal Bldg.
Francis B. Jacobberger, McKay Bldg.
Jones and Marsh, Woodlark Bldg.
Lawrence, Holford & Allyn, Failing Bldg.
Glenn Stanton, Railway Exchange Bldg.
F. Marion Stokes, Terminal Sales Bldg.
Tourtellotte & Phillips, Pearson-Fourth Avenue Bldg.

Salem
Lyle P. Bartholemew, U. S. National Bank Bldg.
Frederick H. Eley, 590 N. 15th St.

Pennsylvania

Allentown
H. F. Everett & Associates, Commonwealth Bldg.
Ruhe & Lange, 12 N. 6th St.

Altoona
Frank Austin Hersh, Commerce Bldg.
Hunter & Caldwell, 3601 Fifth Ave.

Bradford
Thomas K. Hendryx, Box 213

Canonsburg
George W. Brugger, First National Bank Bldg.

Charleroi
Alan C. Brenton, First National Bank Bldg.

Donora
Conrad C. Compton, 4th St. and Thompson Ave.

Doylestown
A. Oscar Martin & Son, Hart Bldg.

Du Bois
Hugh A. Daly, 216 S. Main St.
Russell G. Howard, Deposit Bank Bldg.

Ellwood City
B. J. McCandless, 239 4th St.

Erie
Geo. E. Eichenlaub, Commerce Bldg.
Fred A. Fuller, Commerce Bldg.
J. Howard Hicks, 122 W. 7th St.
Meyers & Johnson, Commerce Bldg.
G. W. Stickle, Commerce Bldg.

Esterly
Elmer H. Adams

Greensburg
P. A. Bartholomew, First National Bank Bldg.
Robert J. Brocker, Coulter Bldg.
C. H. Sorber, First National Bank Bldg.

Harrisburg
Lawrie & Green, 111 S. Front St.
James W. Minick, Second & State Sts.
Wm. Lynch Murray, State Street Bldg.
Joseph Lesher Steele, 23 N. 3rd St.

Hazleton
Harry B. Lentz, Traders Bank

Homestead
Adam G. Wickerham, 135 E. 8th Ave.

Johnstown
Horace A. Bailey, Fisher Bldg.
H. B. Raffensperger, Johnstown Trust Bldg.
Henry B. Rogers, Johnstown Bank & Trust Bldg.

Kittanning
Tillman Scheeren, Jr., Boarts Bldg.

Lake Ariel
Floyd A. Chapman

Lancaster
Henry Y. Shaub, 20½ N. Queen St.

Lewisburg
Malcolm A. Clinger, 33 N. 2nd St.

McKeesport
C. R. Moffitt, Masonic Temple Bldg.

Monessen
H. Ernest Clark, 725 2nd St.

Montgomery
E. J. Kosier, 71 Melvina St.

Mount Carmel
Henry J. Socoloskie, 310 S. Hickory St.

Nanticoke
Geo. P. McLane, Woolworth Bldg.

New Castle
W. G. Eckles Co., Lawrence Savings & Trust Bldg.
The Thayer Co., Greer Bldg.

Oil City
Holmes Crosby, Beers Bldg.

Philadelphia
The Ballinger Co., 105 S. 12th St.
Arthur H. Brockie, Architects Bldg.
Horace W. Castor, Architects Bldg.
Henry D. Dagit & Sons, 1329 Race St.
Davis & Dunlap, Architects Bldg.
Folsom & Stanton, Architects Bldg.
Gondos & Gondos, Architects Bldg.
Francis A. Gugert, Architects Bldg.
Frank E. Hahn, Inc., 1700 Walnut St.
Heacock & Hokanson-C. A. Scheuringer, 1211 Chestnut St.
Walter T. Karcher & Livingston Smith, 1520 Locust St.
W. H. Lee, 1505 Race St.
MacKenzie & Blew, Otis Bldg.
Purves, Cope & Stewart, Architects Bldg.
Savery, Scheetz & Gilmour, Stephen Girard Bldg.
Howell Lewis Shay, Packard Bldg.
Thomas & Martin, Architects Bldg.
Tilden and Pepper, 225 S. 15th St.
Office of Horace Trumbauer, Land Title Bldg.
Wenner & Fink, 1701 Arch St.
Stanley Yocom, Board of Public Education, Parkway at 21st St.

Pittsburgh
W. M. Braziell, 323 4th Ave.
Carlisle & Sharrer, Martin Bldg.
Press C. Dowler, Century Bldg.
Farrell, Smith & Bladel, 309 4th Ave.
J. Lawrence Hopp, 508 3rd Ave.
William P. Hutchins, 507 Liberty Ave.
Richard Irvin, 508 3rd Ave.
Kaiser, Neal & Reid, 324 4th Ave.
Raymond M. Marlier, Empire Bldg.
William Richard Perry, 2882 W. Liberty Ave.
John H. Phillips, Wabash Bldg.
Charles J. Rieger, 529 Sheridan Ave.
M. M. Steen, Bellefield & Forbes St.
A. N. Steinmark, Empire Bldg.
Charles M. & Edward Stotz, Jr., Bessemer Bldg.
Harry Viehman, Chamber of Commerce Bldg.

Pottstown
Arthur S. Kepner, 121 N. Hanover St.

Pottsville
Philip G. Knobloch, 1811 W. Market St.

Reading
Wayne M. High & Sons, 230 N. Sixth St.
W. Marshall Hughes, 147 N. 5th St.
Muhlenberg, Yerkes & Muhlenberg, 5th & Walnut Sts.
Ritcher & Eiler, 147 N. 5th St.

Sayre
Harry C. Child, 501 S. Keystone Ave.

Scranton
Arthur P. Coon, Union Bank Bldg.
Lester Merritt Davis, Rehrig Bldg.
Davis & Lewis, Scranton Electric Bldg.
Hancock & Willson, Mears Bldg.

Sharon
Clepper & Clepper, 72 Vine Ave.

State College
Dean E. Kennedy, Lakes-to-Sea Highway

Stroudsburg
Rinker & Kiefer, Stroudsburg National Bank Bldg.

Sunbury
Davis & Rice, 4th & Chestnut Sts.

Uniontown
H. W. Altman, Fayette Title & Trust Bldg.

Washington
S. Lloyd Beall, Washington Trust Bldg.

Wilkes-Barre
Ralph M. Herr, 140 S. Main St.
Fred J. Mack, 22 N. Franklin St.
Austin L. Reilly, Bennett Bldg.
Stanley K. Walborn, Second National Bank Bldg.

Williamsport
R. Douglas Steele, 34 W. 4th St.
Clarence Wagner, 133 W. 4th St.

York
John B. Hamme, 31 W. Market St.

Rhode Island

Pawtucket
Albert H. Humes, 332 Main St.
Monahan & Meikle, 255 Main St.

Providence
Edward O. Ekman, 72 Weybosset St.
Albert Harkness, Industrial Trust Bldg.
Jackson, Robertson & Adams, Turks Head Bldg.
Rice & Arnold, 49 Weybosset St.

South Carolina

Anderson
Charles Wm. Fant, 109½ Sharpe St.

Bennettsville
H. D. Harrall, 717 W. Main St.

Charleston
David B. Hyer, Peoples Bldg.
Simons & Lapham, 7 State St.

Clemson
Rudolph E. Lee

Columbia
Wessinger & Johnson, Ritz Bldg.

Florence
Hopkins & Baker, Trust Bldg.

Greenville
Cunningham & Walker, 108 E. Washington St.
J. E. Sirrine & Co., 215 S. Main St.

Lancaster
Julian S. Starr, Box 143

Rock Hill
A. D. Gilchrist

Spartanburg
W. Paul Williams, Harris Bldg.

(Continued on page 600)

SECTION IV
OPERATION AND MAINTENANCE

MAINTENANCE OF BUILDINGS AND GROUNDS AT WASHINGTON AND LEE UNIVERSITY

By J. ALEXANDER VEECH

Superintendent of Buildings and Grounds, Washington and Lee University, Lexington, Va.

THE problem of maintenance in small, private endowed colleges has seldom been given the attention it deserves. During the years that income was small, maintenance budgets were the first to be cut and the last to be restored. This has resulted in deterioration of the physical plant in many old schools to such an extent that large expenditures are necessary for repairs and replacements.

Washington and Lee University's oldest building on the present campus is 136 years old, having been built in 1804. The other buildings in the central group were completed in 1824. During the following century the physical plant grew with an expanding student body, and today it includes 14 buildings serving a student body of 950 boys.

In 1934 fire destroyed the Law Building and threatened the beautiful central group. The Board of Trustees authorized the complete remodeling and fireproofing of this old group of buildings and the reconstruction of the Law Building.

Upon the completion of this work a Superintendent of Buildings and Grounds was appointed to take over the maintenance and operation of the University's physical plant, which had formerly been handled by the Treasurer with the assistance of two members of the faculty. The selection of the Superintendent was made because of his engineering education and experience and his particular understanding of the University and the problems involved.

The physical plant put in his care consisted of the 14 college buildings, the central heating plant, and 35 residences located on the campus and outlying property.

The main campus contains 70 acres of rugged land, and outlying property amounted to about 30 acres.

Maintenance of athletic fields remained under the supervision of the athletic department.

In setting up an organization for operation and maintenance the following definition given by H. P. Smith in his book on "Business Administration of Public Schools"[1] proved to be an excellent guide. It states:

> "Maintenance is that phase of school administration which is concerned with the keeping of the physical plant available without interruption for educational service when the college is in session. It is also concerned with the depreciation of the school plant, the corresponding upkeep, repair and replacement of its parts. It includes both the current repairs and the annual summer repairs. It must provide for such custodial and inspectional service as to anticipate defects and correct them before they become a menace to the college and a source of needless expense. This phase of administration is concerned not only with providing workmen to do the repair jobs, but to set up a system of handling the necessary men and materials in an efficient and businesslike manner."

Janitors

The first problem was to train the janitors in the proper use of equipment and materials for maintaining the newly remodeled buildings. Detailed information on maintenance of all types of flooring materials used in the buildings was requested from the manufacturers. Reference to government bulletins, books in the chemistry library, articles in THE AMERICAN SCHOOL AND UNIVERSITY, and other publications, gave a working knowledge of cleaning methods and materials. With this as a background, salesmen of sanitary supplies were interviewed and questioned closely. Products which had been recommended by the building materials manufacturers were purchased and used as per instructions. Each salesman of sanitary supplies was required to demonstrate to the janitor force the correct way to use his particular product, and to follow up on each trip and report to the Superintendent. Whenever a source of

[1] World Book Co., New York, N. Y., 1929.

materials was changed or a new one purchased, instruction of the janitor force was required. This has proved satisfactory to all concerned, and well-kept buildings have been the result.

Both looks and morale of the janitor force were heightened by the University's furnishing windbreakers, shirts and trousers as a uniform. This provided a neat, trim appearance which brought much favorable comment from all sides.

Each janitor has his own equipment and storage closet in the section for which he is responsible. Hooks have been provided on which to hang brooms and brushes. These hooks were added after the first year, and a longer life has been noted in the equipment thus cared for.

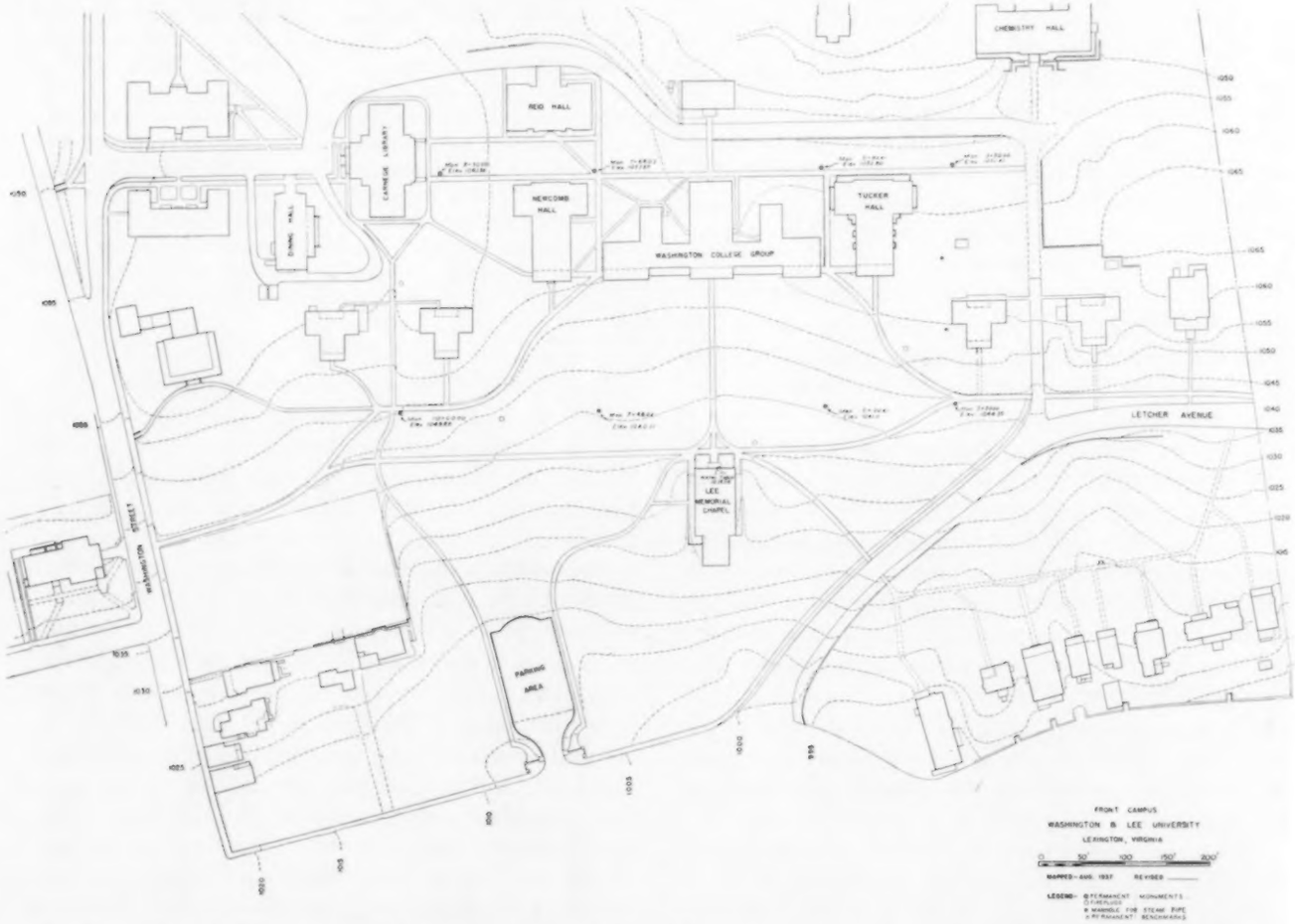
Buildings

The buildings and furniture get special attention four times a year at the vacation periods—Thanksgiving, Christmas, Easter, and summer, when woodwork is washed, floors waxed and furniture polished. Entry and corridor floors require more frequent waxing, depending upon the weather. Rubber mats in the entries with additional cocoa-mats next inside have proved their worth in better-looking floors in wet weather. The new improved "waterproof" water wax used stands up well on the mastic tile floors.

Routine and Special Inspections

With the central group of buildings freshly remodeled, the remaining buildings showed their age and lack of attention even more than before. In order to plan intelligently for their maintenance, it was decided to make a complete inspection and report on each building. With a key organization of carpenter, plumber, electrician and painter, every defect and menace to the efficiency and safety of the buildings was listed.

Moisture is the root of all evil with regard to building deterioration. With that in mind, foundations were inspected for water seepage and settlement that would cause cracks in masonry walls above, building exteriors were examined carefully for cracks, missing mortar joints, soft or loose brick, and other passages for moisture entrance. Wood and metal surfaces were viewed critically for signs of deterioration or corrosion, and the condition of their protective coatings was noted.



Fourteen college buildings, a central heating plant, and 35 residences are spread over a campus of approximately 100 acres

NAME OF BLDG. Dr. J. L. Howe House #4 LOCATION

Roof—Type Tin Condition Bad

Estimated repairs New tin roof
17 x 31½ x 2) 327.59 40# tin
33 1/6 x 48½)

Flashing—type Condition

Estimated repairs

Gutters—type and material 4" galv. Condition bad

Estimated repairs or replacements Need 172' Gutter
40# tin

Conductors—type and material 3" galv. Condition Good

Estimated repairs and or replacements

Other metal work, etc., needing attention—Describe and give condition

Estimated repairs Old roof to paint at once 23 x 104'
Flues are in bad condition

Estimate $343.00

Above—A sample inspection report
Below—Careful records are kept on all repair jobs

A special inspection and complete report on each roof was made by a roofing contractor, who investigated the condition of all roofs, gutters, conductors, flashings, other sheet metal work and their protective coatings.

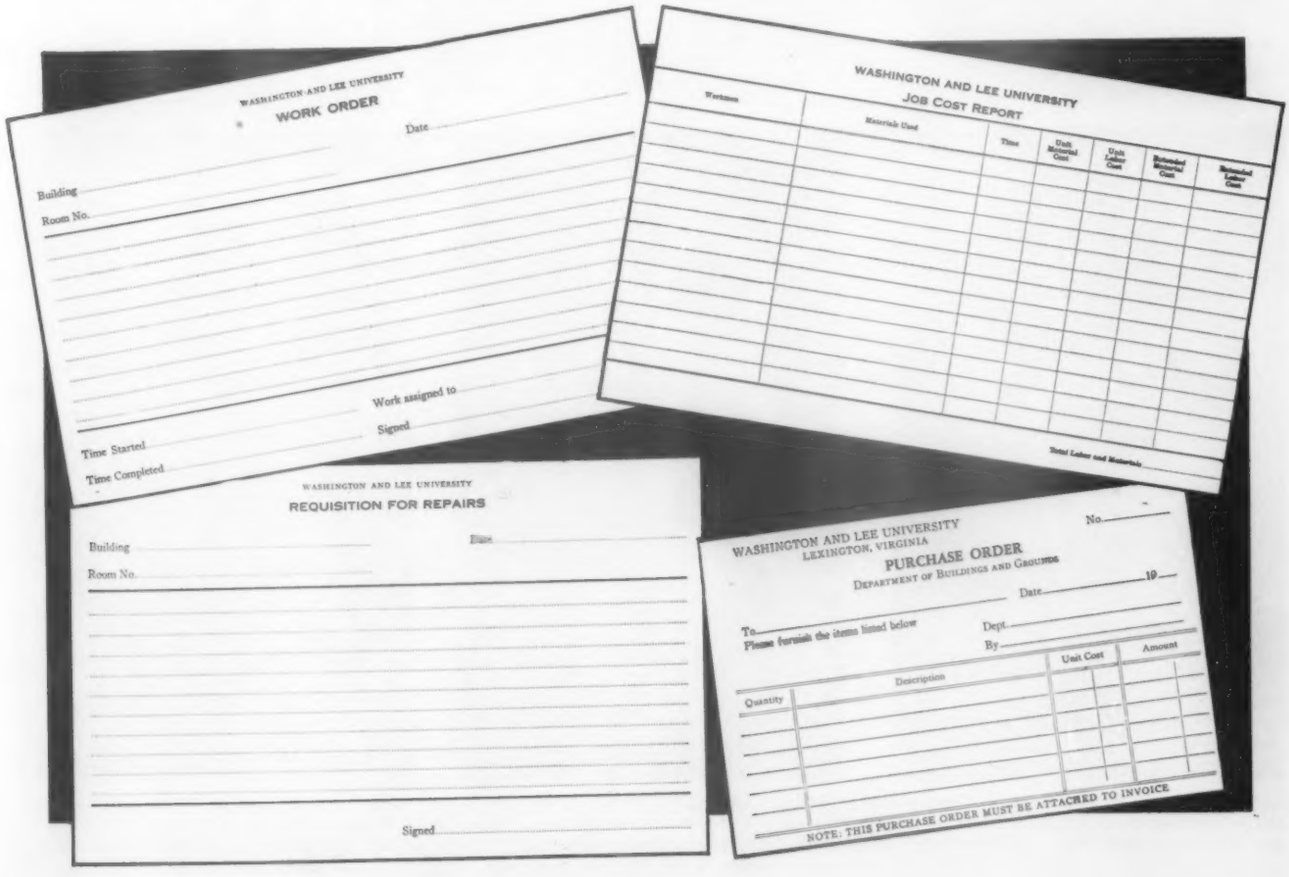
Heating and plumbing fixtures, fittings and pipes were examined for leaks and to see whether repairs could be made without cutting off water or heat from an entire building.

Electric circuits were checked to see if they were properly fused and to find what was necessary to bring the wiring up to code requirements for safety.

Finally, a tour through the buildings with a State Fire Marshal and the fire insurance representative, added valuable suggestions to the other reports from the standpoint of fire prevention and safety.

These inspection reports have been valuable in three ways: first, they were used in estimating and planning the repairs that had to be done immediately; second, they have been the basis for budget requests each year; third, they provide a basis for planning annual repairs. Following the original inspection, a system of periodic inspections has been instituted, so that the file on each building is kept up to date and the planning of work is made easier.

All repairs and remodeling are done with the key organization previously mentioned. In case addi-



Above—
The campus owes its beauty to a wide sweep of lawn and numerous shade trees

Left—
Guard curbs of concrete have been placed around trees in parking areas to keep cars from hurting them

tional help is needed, these men act as foremen on the job. Thus far all work has been done from plans and estimates made in the Superintendent's office.

Cost records of all special jobs are carefully kept and checked against the estimates. All materials and labor are charged against the building where the work is done, and records are kept, so that expenditures to date are always known. Summary sheets give total maintenance costs on each building at the end of the year.

In order to facilitate matters in current repairs, requisition slips are given to all faculty members and dormitory councilors. Cooperation on their part has helped to correct many minor faults before they became major, and to add to the efficiency of the organization. Work orders are made in duplicate, one given to the man assigned to do the work, and one filed in the office. Upon completion of the work, the original is returned with labor and materials marked on it. Charges are figured and the original is clipped to the duplicate and filed. Thus, the duplicate work order file is a ready reference as to uncompleted work, and an aid in planning and assigning each day's work.

Grounds

The campus owes its beauty to its wide sweep of green lawn and its numerous shade trees. Inexperienced and cheap work had left its mark on the trees. A thorough inspection, requiring much climbing, followed by a report from a tree surgeon, made it possible to lay out a three-year plan for putting the trees in

Left—This tree, damaged by a storm many years ago, shows the result of lack of proper bracing and cabling. Trees in such bad shape are not fixed, because the cost is excessive where there are many trees. Next year, however, it will be taken out and replaced by a young tree. Middle—This four-way bracing was done to prevent the whole side of the tree from splitting off, as happened to the tree at the left. Additional cables are hidden in the tops of the trees. Right—Filled cavity and drain in a large elm

good shape. This included filling cavities, cabling, bracing, and clearing of dead wood. Following the completion of this program, annual inspections will be made of the cavities and cuts to see that they are healing properly, and to keep the dead wood cleaned out. A severe storm last spring proved the wisdom of the expenditures in cabling and bracing, for unbraced trees on property surrounding the campus were severely injured, while campus trees remained undamaged.

Soil analyses were used in selecting the proper fertilizer for the lawn. With the correct fertilizer, proper cutting, and reseeding, the lawn made a fine come-back following a three-year period of summer drouths. Mower blades were raised as high as possible and the grass was not cut during dry spells. The results have been excellent.

The natural informality of the campus led to the planting of flowering white dogwoods, redbuds, and other native shrubs. At little cost, and with remarkably few losses, they have been brought from the woods and scattered about the grounds.

A cutting bed has been established and cuttings taken from forsythia, bridal wreath, boxwood and other shrubs. In the future this will be used for replacements and for expanding the landscaping program.

Landscaping plans for additional planting on the front campus are now being prepared. A set of maps to the scale of 1 inch = 20 feet has been made by the Superintendent of Buildings and Grounds with undergraduate student help at an approximate cost of $9 an acre. These maps show one-foot contours, all buildings, roads, sidewalks, trees and shrubs.

Smaller scale maps at a scale of 1 inch = 50 feet have been prepared for use in the Superintendent's office. These show the location of all underground utilities, manholes, water cut-offs, fire hydrants, overhead utilities, and meters. This set of maps is also used to show a record of trees that have been worked on, fertilizer used on the campus, and the kind of grass seed planted. The maps will also be used in planning future development of the physical plant.

All these maps are in sections, so that each sheet is about 22″ x 30″, which is easy to work with. These are traced and the records put on regular black-and-white line prints.

Woodwork Shop

All furniture is repaired, and a large part is made in the carpenter shop. A constant check is kept on the changing needs of the classrooms, laboratories and offices. Tables, desks, bookcases, and other items are requisitioned and made in the shop. During dull periods, replacements for the dormitory furniture are made and stored for future use. Several thousand feet of maple, oak, and walnut are kept on hand for making special pieces of equipment. This is stored in atmospheric conditions similar to those in the college buildings, so that shrinkage and warping of furniture will be kept at a minimum.

Practically all the bookcases and desks are made to specifications given by the faculty, since personal requirements and office space vary in the departments.

Costs of all projects are kept and checked against commercial prices on the same equipment.

Residences and Rental Property

A study of the faculty residences and other rental property was made in the same manner as outlined for the university buildings. From the inspections and reports, a plan was set up for remodeling and redecorating this property as fast as the budget permitted. Work indicated in the inspections as immediately necessary has been carried out. Now the exteriors are being painted, a few each year, so that a four- or five-year cycle of painting will result. Papering, painting, and varnishing floors on interiors of long-term rental property is being put on the same cycle.

Thus far, six houses have been partially remodeled and modernized from plans and specifications made in the office of the Superintendent of Buildings and Grounds, all work being done by college workmen under his supervision. Four of the large residences on the campus are 125 years old and three are slightly older, all occupied by members of the faculty.

Heating Plant

The old central heating plant was replaced in 1938 with new automatic equipment. Powered by two 150-horsepower boilers with automatic combustion controls, the circulating hot water system furnishes heat for twelve of the college buildings and fourteen of the faculty residences on the campus. Under the care of a chief engineer, the plant requires regular summer inspections and replacements and such special attention as is necessary while in operation.

Elements of Success in the Program

In the inspection and maintenance program the cooperation and good-will of all departments and individuals served is important. Diplomacy on the part of the Superintendent and the workmen is necessary in making it a success. The plan of organized inspection and maintenance as outlined, the forms and the paper work involved, have been started in a modest way and developed as experience dictated. The system is flexible and designed to meet the requirements of the individual plant and the personnel involved.

TESTING SUPPLIES AND EQUIPMENT IN TERMS OF PERFORMANCE

By JOSEPH L. ERNST

Purchasing Agent, Board of Education, Rochester, N. Y.

PURCHASES by educational institutions and public schools fall generally into two major classifications—supplies and equipment. Often it is difficult to determine whether an item belongs in one group or the other. For the most part, supplies are expendable and are used in maintenance, production, laboratory experiments, kitchen, etc. Items classed as equipment are more or less permanent, have lasting qualities or durability, or become a part of the building or machine. The approach to the purchasing function of the items in these groups is quite different. The main question as to supplies is whether the product meets requirements economically and efficiently. On the other hand, in buying equipment, emphasis is placed on those quality factors indicating longevity and endurance.

Specifying and Testing

Specifications are a handy and necessary aid in securing merchandise of the best value to meet requirements. The heart of the specification is the section headed "Tests." Under this heading the prospective source of supply should be able to find listed the performance tests required of his product.

When a manufactured article is purchased, it is reasonable to suppose that it is the product of an expert in his line, an expert who desires above all else continued and satisfied customers. Business successes have never been built on the "single order" basis. Repeat orders are the dividend-payers. It is questionable whether a buyer is on safe ground when he attempts to dictate to a manufacturing expert how to make his product. However, buyers are on solid footing when they indicate what they expect of a product. It then is the problem and the duty of the maker to produce the goods. The "test" becomes the check to insure the buyer that the supplier has correctly interpreted his needs.

The All-Important Test is Use

The most satisfactory and conclusive test for items of school equipment and supplies is that of actual performance. Specifications are more and more being written with that test in mind.

In Rochester, as in most progressive school systems, we are more interested in what a product will do than in what it is made of. To check purchases, or prospective purchases, we apply where necessary the test of actual use. If, for example, dish-washing compound is needed, a product is wanted that will safely, economically and efficiently clean our chinaware. It does not particularly concern us of what chemicals the product is compounded, or what its formula is, if it is pure and harmless. The same applies to wax for floors, soap for personal use, and detergents for cleanliness.

In some cases, as in liquid and toilet soaps, Federal specifications are used for standard and the product is checked and tested accordingly. Federal specifications can be made to serve as an efficient standard in the selection of many school requirements.

In our school educational work, and for maintenance purposes, several kinds of varnish are used. Federal specifications apply in two grades used, but in the case of a rather inexpensive manual training varnish we have set our own limits, based on what we require, and on the basis of our tests we secure a satisfactory product at a low cost.

Such fuels as coal and oil are carefully specified

DEPARTMENT OF PUBLIC WORKS
DIVISION OF ENGINEERING
SECTION OF TESTS AND MATERIALS
ROCHESTER, N. Y.

REPORT ON [redacted] Powder

LAB. NO. 3708-39 DATE REPORTED Mar. 10, 1939

NAME OF MATERIAL [redacted] Powder (material now being used for cleaning & laundry work)

SUBMITTED BY Mr. Jos. L. Ernst, Board of Education

SAMPLED BY SAMPLED FROM DATE 19

DELIVERED BY Board of Education DATE Feb. 27, 1939

RECEIVED AT LAB. Feb. 27, 1939 TESTED BY Sprengart

EXAMINED FOR Chemical Analysis

TESTS RESULTS

Loss on Ignition	41.79%
Silicon Dioxide (SiO_2)	28.43%
Sodium Oxide (Na_2O)	29.10%

REMARKS: - The results of this analysis indicates practically no difference in the composition of this material and Meta Silicate Powder, Lab. #3707-39.

In the Carpenter Shop 3/15/39 - The same

C. Sprengart
SUPERVISOR

Form used for reporting to the purchasing division

and as carefully tested. The facilities of the Section of Tests and Materials of the Department of Public Works of the City of Rochester are available for the use of the School Board. In addition to this laboratory, the Science Department of the school system assists in the preparation of formulas and the testing of supplies, as, for instance, proper conditioning of swimming pools and uniform laundering standards.

Paper Products—Classroom Supplies

Paper is a product that bulks large in a school buyer's list—paper of all kinds—towels, toilet tissue, mimeograph, writing (for both ink and pencil), wrapping, etc., and paper products—bags, envelopes and napkins—to name only a few. The quality of the various papers can be specified as to thickness, weave, percentage of sulphite or ground wood, tensile strength, bursting and tearing points. But all these are simply guides in the setting-up of standards for the only practical test—continual use. Towels must dry the hands by quick absorption, without disintegrating, linting or objectionable odor. Toilet tissue must be reasonably soft and contain no injurious chemicals. Paper for duplicating machines must operate through machines easily, with a minimum of offset, and must take ink. The various grades of ink writing paper must be carefully ruled, or if plain be of a surface that will take ink on both sides without feathering. Kraft bags must be durable and strong; envelopes reasonably tough, non-transparent and with glue that sticks and holds the flap.

The only safe and sure tests for all the mentioned paper products are the tests of actual use by the people concerned and for the purposes intended.

If you have samples of the paper products that you are using and wish to duplicate, such samples may be listed as part of your specifications. State that the products to be furnished shall be the equal of your samples in the matter of the various practical tests you deem necessary. Our experience in Rochester thus far in this method of specifications has been entirely satisfactory.

The same method has been used in specifying major items of pencils, crayons, chalk and paints.

A public buyer is somewhat at a disadvantage over the purchasing agent for private industry, for, if he dogmatically insists on a product of a certain manufacturer, he will sooner or later be charged with favoritism or called even a harsher name. A buyer for a private concern, once he has found a satisfactory product at the right price, can stick to that product without much danger of too harsh criticism.

The matter of art supplies causes the school buyer many a headache because personal preference, either genuine or imaginary, often enters to a considerable extent. Falling back on the blindfold test is one way of settling this question, particularly if prices quoted on several lines happen to be identical or if a lower bid is received on a lesser-known brand.

The item of chalk brings up an interesting point in that, while a product may be excellent for its major use, it may be harmful in another manner. Several grades of chalk are manufactured and sold. One of the cheaper grades may be just as efficient for blackboard work educationally, but it may make cleaning more difficult and increase maintenance costs. It may even tend to injure blackboard surface. In this case, first economy quite likely will prove false economy. Only actual tests will indicate the truth or falsehood of this possibility. A certain tile powder may be very efficient for cleaning walls, but when in contact with metal may do great harm.

The Purchase of Furniture

When it comes to some of the major items of equipment, such as pupils' and teachers' desks, seats, chairs and tables, the question of upkeep after purchase bulks large as a factor in specifying and testing. Pupil seating must be substantial in construction to withstand the constant use day after day by restless youth. Hidden factors of construction must be taken into consideration, or the buyer will find that later repair costs more than offset his initial low price. The refinishing and repair of furniture is a big item in maintenance cost, not only to the large city school system but to colleges and universities as well. If the regular commercial product of furniture factories is used, then it behooves that severe tests be given to discover whether the product is solidly put together to withstand the usage to which the desks and seats will be exposed. If, however, one dictates in detail how the furniture is to be manufactured, tests must be made to assure the buyer that his demands have been met. Perhaps when it comes to the finish of students' furniture, a let-down in quality may be tolerated, for it has been the experience of many that knife-blades, pencil-points and pens can mar the best of finishes quickly and do more dollar damage than would result if just an ordinary finish at much less cost were used in the first place. These are questions that should be carefully discussed by the buyer and the superintendent of maintenance. In general, best results are to be obtained by using standard equipment and profiting by the manufacturer's experience, not alone in one community, but perhaps throughout the country.

I recall two experiences in connection with furniture that we had under P.W.A. specifications. In the first instance we were buying pupil-seating—the connected desk and chair type. Before writing our specifications, we asked for samples from leading makers and after careful tests we made a selection of three brands that in our judgment best met the needs. In writing the specifications we intended to include the features that would without doubt permit any of the three, if lowest in price, to be accepted without question. One of the manufacturers advised us that semi-steel was used in construction, so we stated among other things that the framework might be made of semi-steel. This particular make of desk was the lowest in price when bids were opened; it was entirely satisfactory to us, and yet a competitor

challenged our specifications and the use of semi-steel —even going so far as to have a piece of the metal tested in an attempt to prove it was only cast iron. However, we were able to establish our point with P.W.A. officials, and the award was made. Actually, we did not care what the analysis of the metal was—our earlier tests proved to our satisfaction that it was strong and durable.

In another case we wished to purchase teachers' steel desks. Our detailed specifications stated that the desk was to have eight legs. This feature was included in considering but one sample. The low bid came in on a splendid-appearing and solidly constructed piece of furniture with only four legs. Before a competitor had spotted this discrepancy, our cursory examination of the sample submitted indicated that the desk in every particular met our needs, in fact the four legs seemed an improvement. Of course the maker of the eight-leg desk, who at that time was not manufacturing a four-leg desk, protested. The low bidder, however, offered to prove in any way necessary that his desk was the equal of the other. Our tests demonstrated to us the validity of his claim and showed us that we were too specific. We recommended to P.W.A. that the four-legged desk be furnished, and this recommendation was approved. Shortly after this, the losing manufacturer began the making of desks with four legs. These two instances prove that one can make details of specifications too minute and by so doing lose sight of the ultimate use to which the product will be put. We have never regretted our purchase of either the semi-steel student desk or the teachers' four-legged steel desk.

The Test of Typewriters

There are several good makes of typewriters on the market, and each has his or her champions. The leading makes must all be good to meet constant competition. However, a record of repair costs, the number of times the repair man must be called for each typewriter, and the charge for each visit, may give one reason to have a preference. While we use typewriters of all the leading makes, the price being the same, we use them in varying quantities based on our upkeep costs. Just another instance of actual performance.

Does It Perform?

In small purchases as well as large, in the buying of mousetraps as well as microscopes, buy the product that best meets your needs. If your specifications reflect this need and your tests prove it, then your buying is efficiently and wisely done.

Photograph by Paul E. Smith

Chemistry Laboratory, Rochester, N. Y.

A SUMMER RENOVATION AND RECONDITIONING PROGRAM

By R. H. PARK

Assistant Superintendent in charge of Operation and Maintenance and Purchasing, City Public Schools, Lincoln, Nebr.

THE physical plant of the Lincoln public school system consists of 35 buildings located on 27 sites. At three sites the heating plant is housed in a separate building. The oldest building was constructed in 1872; however, a number of the buildings were constructed or remodeled between 1922 and 1928, so that, with the exception of a few buildings brought into the school district by annexation, all buildings used for instructional purposes are well designed and constructed to meet the needs of the present type of school program. Three elementary school buildings have been constructed under PWA the past two years. These replaced three old buildings that had become obsolete.

The present buildings are of the following types of construction: fifteen of brick, tile and concrete; sixteen of brick and wood joist; two, one-half brick, tile and concrete, and one-half brick and wood joist; one, wood frame; one, wood and stucco.

The smallest building consists of four classrooms, auditorium, office, basement playroom, and two toilets. The largest building has 75 classrooms, four industrial art shops, auditorium, two gymnasiums, swimming pool, cafeteria, library, eight toilets, and a number of small rooms used for offices. The cubical contents of the small building are approximately 175,000 cubic feet, and of the larger 4,966,000 cubic feet. The area of the school district at the present time is 43 square miles; however, most of the larger buildings are located within an area about three miles square. The value of the present school buildings is placed at $4,406,773.

The Regular Maintenance Work and Crew

The care and maintenance of such a group of buildings and their equipment is very important, for all must be kept in good usable condition, and the cost of such maintenance must be kept within reasonable limits. This school system, like many others, has found it necessary to make a number of revisions in its maintenance program, due to the decrease in the tax revenue. The maintenance work is divided into six main divisions; (1) carpentry; (2) electrical; (3) painting; (4) plumbing and steamfitting; (5) heating and ventilating; (6) upkeep of grounds. These divisions, except upkeep of grounds, operate during the entire school year, and they also provide the nucleus for the increase in maintenance crews during the summer renovation periods. A foreman heads each of these divisions, and the workmen assigned to any division are responsible to their foreman.

The foreman and several helpers constitute the regular maintenance crew—two carpenters, one electrician, one painter, one plumber and steamfitter, one heating and ventilating helper, and one blacksmith and welder, who also serves as helper on the plumbing crew. For the summer renovation program, the crew is augmented by the custodial staff employees. Quite a number of the custodial staff have had experience in some building trade, which, in addition to their being acquainted with the various buildings, makes this type of set-up a very flexible and economic arrangement, and also provides twelve months' employment for these men.

During the latter part of the heating season, the custodians are requested to chalk-mark, or otherwise indicate, leaks in the heating system—radiation, pipes, or valves, so that they can be readily located and repaired during the summer. The sash and sills of all buildings included in the outside painting program are carefully inspected before the close of school. Requisitions for all such repairs are forwarded to the maintenance department, where they are checked and distributed to the various maintenance divisions. The order in which these repairs are to be made is set out, and as much of the necessary material as can be determined in advance is purchased and delivered ready for use.

Nearly all these supplies and materials are received and checked through the receiving division of the stores department. The trucking division of the stores department then delivers these materials to the buildings as requested by the various foremen. Such materials as sand, gravel, cement are usually delivered by the vendors directly to the job.

Carpentry—Plastering—Roofing

The carpentry crew consists of fourteen men, who take care of all carpentry work, plastering, roofing,

repair or replacement, curtains, locks and door checks. Two to four men are assigned to repair sash and sills ahead of the painting crew. Sash are removed and brought into the central repair shop, where the necessary repair is made. All sash removed for repair are usually replaced the same day to prevent vandalism at the buildings or damage from rain. The extreme hot, dry weather in this part of the country the past few years has caused more rapid deterioration of paint than usual, which has resulted in more rapid decay of sash and sills thus exposed to moisture. Many a sash that looked sound has been found to be only a shell when the paint crew started work on it.

The major portion of the plastering is done by two men, one plasterer and a tender. Their work is confined to plastering where partitions have been changed or where it is necessary to repair small areas of fallen or broken plaster. Particular care is taken to inspect all ceilings where leaks occur that the plaster is safe. All such places are repaired. Large areas of ceiling plaster that are dangerous are sometimes made safe by stripping the ceilings with 1 x 1½-inch white pine strips and then covering the areas with weatherwood, Insulite or similar insulating material. This type of repair is more economical than replastering, and in addition cuts down the heat loss during the heating season and also helps in reducing the noise.

The climate in this locality is particularly hard on built-up roofs, owing to the extreme hot and cold weather. The temperature during the summer often reaches 100° or more, and drops 10 to 15 degrees below zero during the winter months. This causes considerable expansion and contraction in the roofs, and the volatile oils in the roofing material evaporate more rapidly, owing to high temperatures. No uniform system of roof maintenance has been found feasible, since deterioration of the roofs varies considerably in the different buildings. When hot asphalt is applied, the roofing repair crew consists of four men. Where a built-up roof is entirely replaced, a layer of 15-pound roof felt is nailed securely to the roof sheeting. This receives a coat of hot asphalt, in which a second layer of 30-pound felt is laid. The second layer of felt is thoroughly coated with hot asphalt. Care is taken that all asphalt coatings are kept to a minimum thickness to prevent cracking, as the oils in the asphalt evaporate. In many cases the paper is in good condition and it is only necessary to apply one coat of hot asphalt. Owing to the rapid increase in the number of kinds of cold application type of material, some repairs are being made with this material. A crew of two men can apply it. The cold application type of material is used only when the paper of the original roof is in good condition, and where only one coating is required.

The repair of old furniture and the construction of new furniture is carried on at a shop in the Lincoln High School. This shop and its equipment are also used for instructional purposes during the school term. One or more men, as necessary, are assigned to this shop. Practically all furniture requiring regluing or replacement of broken parts is transferred to this shop. If it is from a building in which furniture is being refinished, it is returned to the building for refinishing; otherwise the repaired parts of the furniture are refinished before it is returned to the building. Tops of Moulthrop desks that require sanding before refinishing are sanded in this shop. The rest of the carpenter's crew take care of such changes as moving or removing partitions, building bookshelves, repairing locks, curtains, repairing and overhauling door checks, glazing, and other related maintenance jobs. The majority of the curtain replacements are deferred until the latter part of the summer, in order to prevent deterioration from the heat. New shades are thus in the best of condition at the beginning of the school term.

Electrical Work

As there has been little new electrical equipment installed the past few years, two men have been able to take care of the necessary electrical work. This crew can be increased by several men from the custodial staff as needed. All electric motors are inspected once each year by the crew, usually during the summer. The old oil is drained from the bearings, which are carefully checked for signs of failure and then refilled with new oil. This prevents shut-down of electrical equipment during the school term. A careful check is kept on batteries used in the operation of various clock systems. Batteries failing to take a charge or retain their charge are replaced at once.

Painting

The painting program is usually the largest item in the summer renovation program. This program now functions on the following basis:

Every Four Years

1. Paint all outside woodwork, metal work, and flagpoles.
2. Varnish or paint interior sash and sills and interior entrance doors.
3. Enamel furniture in Nurses Clinics.

Every Eight Years

1. Varnish or paint furniture.

The total cost of this program has been determined for the 35 buildings; one-fourth of this cost for certain buildings in the four-year program, and one-

Form 1—Used by foremen of maintenance crews on the larger repair jobs for recording all labor and material used

Form 2—For use in duplicate. Authorizes and lists items to be moved by Trucking Department as requested by maintenance crew foremen

Form 3—Requests for repairs, purchase of new equipment or supplies are initiated on this form, in duplicate

Form 4—Authorizes work to be done and provides means for accounting for all time and material used in any particular job; used in quadruplicate

Form 5—Every maintenance man turns in one of these time cards every day. This provides means of accounting for all labor costs on any job

eighth of the cost to varnish furniture under the eight-year program, are set up in the budget each year. At the end of four years all buildings have been painted under the four-year program, and at the end of eight years all furniture has been varnished or painted. This arrangement allows approximately the same amount to be set up in the budget each year, in order to carry out the program. Previous to 1932-33 the eight-year program included the painting of the interior walls and ceilings and varnishing the woodwork, but owing to lack of funds this has been discontinued except in special cases when considerable other repair is necessary.

A crew of approximately eighteen men do the outside painting. This crew is divided into three parts. Four men are usually assigned to remove the cracked paint from the window-sills and calk all joints between the outside of the casings and the brick. In some instances it is necessary to burn the paint off the sills in order to have a uniform, smooth surface for the paint to adhere to. Experience has indicated that it is much better to remove the old cracked paint before applying new paint, particularly on flat surfaces such as window-sills.

A crew of seven men follow the calking crew, applying the first coat of paint. It has been the policy for several years to use a soft paste lead and mix the paint on the job, using the formula recommended by the National Lead Co. The first coat of paint is allowed to dry at least six to eight days, then the second-coat paint crew of seven men apply the second and final coat of paint. This crew also carefully inspect the glazing on all sash, and any unglazed portions previously missed are repaired.

Each man in the outside paint crew is supplied with a Little Giant window jack, originally selected as the type best suited for use by the custodians in washing windows. The platform of the jack is large enough to allow freedom of movement by the workman and still give him protection. By increasing the length of the legs of the jack, sufficient height is obtained to reach all parts of each window. A removable seat that can be locked in position when used on the jack has proved very satisfactory in reducing fatigue and at the same time increasing the safety factor of the jack. It is possible, except in a few cases, to paint all windows through the use of the window jacks. The few that cannot be reached in this manner are reached with extension ladders or painter's scaffold. A good grade 2-inch paint brush is used for the outside painting of sash and sills.

The varnish and paint crew for the interior sash and sills consists of eight men. The sash, particularly the horizontal rails and the sills, are thoroughly cleaned and steel-wooled before varnishing. The horizontal wood strips of the sash are usually given two coats of varnish, since moisture stands on this part of the sash for long periods, causing the varnish to break away, and expose this part of the wood sash to moisture, causing it to decay or become discolored. It is possible to reach practically all windows by the use of step ladders. Two-inch varnish brushes have proved the most satisfactory size for varnishing sash and sills.

The varnish crew for the furniture consists of ten men. This work is done at the building. Desk tops and other furniture may be repaired in the central repair shop when sanding, planing or replacement of broken parts makes this move the most economical. All furniture is thoroughly washed before it is varnished. During the past summer this part of the work was done under a WPA project, usually, however, three or four additional men or women are assigned the crew to take care of this work. An emulsifying solution is used for washing. After washing, all tops of tables and desks are thoroughly inspected for cuts and other abrasions. Practically all school desks are the wood Moulthrop type movable desk, although there are a few old-style stationary desks still in use.

Desk tops on which the varnish is fairly smooth are given a light hand sanding. Varnish on desk tops that is badly cracked or has flaked off, leaving an extremely rough surface, is removed with varnish remover. Desk tops on which markings or cuts reach into the wood surface are machine-sanded and in extreme cases may be run through a planer. The last operation can be done only with solid wood tops. After sanding, all the tops are stained the proper color to match the rest of the furniture. When thoroughly dry, all tops are steel-wooled, using No. 0 or No. 00 steel wool. Three or four men usually take care of the sanding and staining. The remainder of the crew do the varnishing. The entire piece of furniture is given a coat of varnish, and the desk tops and table tops are given two coats. All desk tops or other parts of the furniture receiving more than one coat of varnish are sanded between the coats. A gloss varnish is used for the first coat, and semi-gloss for the second coat.

To one man on the paint crew with a ¾-ton truck is assigned the task of keeping supplies and equipment at the points where they are needed. The various foremen on this maintenance division keep this man informed at all times regarding their requirements. The service may be supplemented by that of the regular trucking crew when heavy equipment or the amount of supplies is too large to be moved by the small truck. The majority of all equipment, such as ladders, window jacks, and pails used by the paint and varnish crew, are items assigned to the various buildings during the school term. All equipment is

marked with the school name, so that at the close of the summer maintenance program it can be returned to the proper building.

Plumbing and Steamfitting

The plumbing and steamfitting crew consists of nine men and is usually divided into two crews. One of these smaller crews takes care of plumbing installation made necessary by remodeling or relocation of equipment, and keeps in close touch with the carpentry crew in order that its part of the installation may be made with the least delay to the carpenters. The steamfitting crew repairs all leaks in steam lines and returns, and all radiation. A number of the radiators in the buildings are extra-long and heavy, owing to the use of window type ventilation, so that at least four men are required to handle most radiators. Leaky nipples and cracked sections are replaced, and all hangers on repaired radiators are inspected as a safety measure. The requisition for the above repairs states the room number and location of the particular part to be repaired, so that the work can be planned and done with the least amount of travel and loss of time. This is important, particularly where a crew is composed of four or five men, for even small delays cause considerable loss of time and money. Covering that has come loose on heating lines and boilers is replaced, to prevent heat losses. Return lines and steam lines are regraded as necessary, to prevent water pockets.

The plumbing crew also inspect and adjust all drinking fountains before the opening of the school term, so that the correct amount of water is delivered. It is often necessary to clean or repair the adjusting mechanism, for this part becomes corroded during the summer months. One requirement that is followed carefully during the summer is the flushing of all flush valves on toilet bowls at least once each week. This keeps the working parts of the flush valve from drying out, and therefore less maintenance is required to keep them in good operating condition. One man is assigned to each building to see that this operation is carried out at least once each week. With few exceptions, it can be done in one or two hours.

There are 52 boilers in the various heating plants. With the exception of seven of the smaller heating plants, all are equipped with two or more boilers. All heating plants are the low-pressure type except one at the Lincoln High School, which is a high-pressure type. The boilers in all the heating plants are inspected by a qualified inspector from the maintenance staff. A record is made of all boilers where boiler treatment is not being properly used, so that instruction on the correct amount of such material can be given during the heating season. It can usually be determined at least a year in advance that tube replacement is necessary. This makes it possible to purchase the tubes and have them on hand for installation during the summer.

Heating and Ventilating

A part of the work of the heating and ventilating crew, which consists of seven men, is the testing of the interiors of all steam traps with live steam. Those found defective are replaced. About 1½ per cent of the trap interiors tested are found defective. This testing not only prevents considerable trouble during the heating season due to leaky traps, but also helps to make the operation of the heating system more economical from the point of fuel consumed. A few leaky traps can disrupt a heating system and cause not only inconvenience to the teachers and pupils, but considerable loss of time in locating the difficulty. Owing to the small maintenance force in service over the heating season, it is desirable that such failures be held to the minimum at that time. A chart is kept of the number of traps in each room and other parts of the building, and the exact number of interiors removed for test must check with this chart. Likewise, the number of interiors reinstalled must check out, so that no traps are missed. One part of the crew takes care of the removal and installation, and the rest of the crew does the testing. This work is usually done as soon as the school term closes.

The heating and ventilating crew also make small repairs on boilers. Broken and worn-out pet-cocks are replaced, firebrick linings and bridge walls that have partially or wholly burned out are replaced. A large majority of the linings and bridge walls can be repaired by the use of a good grade of plastic firebrick material, which is satisfactory as well as economical for this type of repair to the school heating plant.

Air compressors on the temperature-control system or vacuum pumps that seem to be worn or have given trouble during the heating season are disassembled as soon as the school term closes. Any worn or defective parts are ordered at once, so that repairs can be completed during the summer. It has been found economical to replace a number of flat belt drives and a few silent chain drives on fans and air compressors with V belts. The service of the V belt type drive as compared with the flat belt type is more dependable, and there is less wear on the bearings, owing to the decreased tension. As it is possible to bring the centers of the driving pulley on the motor and the driven pulley on the fan or air compressor closer together, the costs of making such a change may be less than the replacement of the flat belt.

Floor Maintenance

During a part of the summer a crew of four men seal or treat floors. The majority of classroom and corridor floors are covered with cork carpet. A few buildings have wood floors, and two buildings have composition floors. The corridors in buildings having wood or composition material, and three buildings having cork carpet in the classrooms, are of terrazzo. The program outlined here is confined to wood floors and cork carpet. Four or five buildings are treated each year. Owing to proper maintenance of the floors during the school term it has not been necessary to do much scrubbing before the floors are treated. Wood floors receive the following treatment. The floor is first mopped with a damp mop, to remove all dust and loose dirt. It is then treated with a mixture of one-half linseed oil and one-half turpentine by volume. If the floors are in an extremely dry condition or if the temperature at the time of application is rather high, a mixture of 60 per cent linseed oil and 40 per cent turpentine may be applied. It is mopped onto the floor with 14-ounce cotton string mops and is allowed to remain on the floor about twenty minutes. All the excess material is then wiped up with a dry mop. It is essential that no excess material remain on the floor, since it will become sticky and cause dirt and dust to collect at such points when sweeping. The floor is allowed to dry at least 24 hours, after which it is given a light burnishing with a steel bristle brush on a rotary floor polishing machine. It then receives a treatment of spirit solvent liquid wax, which is thoroughly polished. The cork carpet receives a similar treatment except that it is not necessary to use the steel bristle brush after the mixture of linseed oil and turpentine has dried. The dry mop method of sweeping is used; it is found that the sweeping is done much easier and better, and it does not require as much wax to keep the floors in condition to do a good job of sweeping. There are many seals on the market that are easier to apply and more effective in bringing out the grain on wood floors; however, the method described above has been found a very satisfactory and economical way to keep floors in good condition.

Upkeep of Grounds

Most of the grounds about the school buildings are landscaped, and practically all the schools have considerable playground space. The upkeep of these grounds and the care of the shrubbery is an important part of the summer program. A crew of fourteen men look after this part of the work. Shrubbery and lawns must be watered and the lawns kept cut. Weeds must be cut on playgrounds before they become large enough to cause a hazard. Several motorized units have been found particularly useful in the care of the grounds. This equipment consists of one 20-inch power lawn mower, one Fordson tractor with mower attachment, and one Fordson tractor with 12-foot grader blade. The power lawn mower is used on relatively large lawn areas. The Fordson tractor with mower attachment is used for mowing weeds and grass on the large play areas and parkways. The playgrounds if surfaced are covered with torpedo gravel. When first applied, this covering is about 1 inch thick. As playground play is usually confined to certain areas, the gravel or dirt is worn away in such areas, and holes may be worn in the play surface until water stands for considerable periods. Through the use of the power grader these low areas are filled in and the gravel is redistributed over the entire playground area. This also keeps the weeds down and aids in proper draining.

This crew also take care of small replacements of broken sidewalk, install drains where necessary to prevent washing of grounds or terraces, trim shrubbery and trees, and install guard-rails for the protection of shrubbery. Old boiler tubes removed from boilers, or used pipe that is not suitable for use in building repair, are welded to form guard-rails to protect the shrubbery wherever children have started to make paths through it. The guards are very durable and can be painted easily, so that they may add to the beauty of the shrubbery and grounds.

A trucking crew of five men with three trucks, two 2½-ton dump-body trucks and one 1-ton panel truck, take care of the moving of heavy equipment, supplies, furniture, rubbish, weeds, etc. The foremen of the various crews consult the foreman of this crew in advance of the need and arrange for the number of trucks and men to take care of any particular jobs. In addition to this trucking service, the various maintenance crews are furnished trucks equipped with tools and small items for repairs that are commonly needed. As the maintenance crews are usually limited to two to five men, and the buildings are scattered throughout the school district, this plan is most essential to economical and orderly procedure in making repairs or renovations. Most of these trucks do not exceed in size the ¾-ton pick-up or panel style truck. The distribution of the trucks is as follows: carpenter crew, 4; electrical crew, 1; painting crew, 1; plumbing and steamfitting crew, 3; heating and ventilating crew, 1; upkeep of grounds crew, 2. As some of these trucks are required for service only during the summer months, used trucks have been found to serve satisfactorily, and their first cost is considerably less than that of new trucks.

HORN

Presents

PRODUCTS
for
PROTECTION
and
DECORATION

There is a HORN Waterproofing, for every Institutional

CAMPUS BENCHES

Hornac; Horn RM Paint; Horn Rexide

EXTERIOR WOOD TRIM

Hornac Non-Penetrating Primer; Hornac; Horn RM Paint; Horn Rexide

BOOKCASES, CABINETS, DESKS

Horn Duocrex Gloss — Semi Gloss — Dull Finish; Hornglaze Cleaner; Horn Varnishes

KITCHEN

WALLS AND CEILINGS:

Horn Suction Sealers; Horn Super Fume Proof Undercoater; Horn Super Fume Proof Enamel; Horn Namel; Horn-O-Tone

FLOORS:

Hornbrite; Hornglaze Cleaner; Horn T N T Cleaner; Horn PDQ Koncrex; Horn Concrete Floor Enamel Horn Duocrex

CLASSROOMS

WALLS AND CEILINGS:

Horn Suction Sealers; Horn-O-Tone; Horn Commercial Flat; Horn Super Fume Proof Undercoater; Horn Super Fume Proof Enamel; Horn Namel; Horn Streamlite

STAIR TREADS

Horn PDQ Koncrex; Horn Duocrex; Horn Nu-Way Resurfacer

CAFETERIA

WALLS AND CEILINGS:

Horn Suction Sealers; Horn Super Fume Proof Undercoater; Horn Super Fume Proof Enamel; Horn-O-Tone; Horn Commercial Flat; Horn Streamlite; Horn Namel

TABLES — CHAIRS:

Hornglaze Cleaner; Horn Duocrex; Hornspar Bakelized Clear; Hornglaze Wax

CONCRETE FLOORS

Horn Crete-Fix; Hornolith; Hornstone Crystals; Horn PDQ Koncrex; Horn Concrete Floor Enamel; Horn Duocrex; Hornglaze Wax; Horn Color Paste Wax

CORRIDOR FLOORS

TERRAZZO — MARBLE AND TILE:

Hornlux; Hornbrite

COMPOSITION:

Hornlux; Hornglaze Cleaner; Hornglaze Wax

CORK:

Horn Paste Filler; Horn Florcrex; Hornglaze Wax

OTHER TYPES:

(See Classroom Floors)

ROOFS

Horn Dri-N-Tite Primer; Horn Dri-N-Tite Liquid; Horn Dri-N-Tite Plastic; Horn Triple Flex Fabric; Horn Elastex Primer; Horn Elastex Liquid; Horn Elastex Plastic; Horn Rexide; Horn Elasticon; Hornlume

WINDOW FRAMES

PAINTING:

Horn Galvanide; Horn Metal Primers; Horn Super Aluminum Paint; Hornac; Horn RM Paint; Horn Rexide

CAULKING AND GLAZING:

Horn Vulcatex; Hornlastic; Horncaulk

CLASSROOM FLOORS

WOOD:

Horn DX Cleaner; Hornglaze Cleaner; Horn Florcrex; Horn Duocrex; Hornglaze Wax

LINOLEUM: Hornglaze Cleaner; Hornglaze Wax

ASPHALT TILE: Horn Colorback; Hornglaze Cleaner; Hornglaze Wax

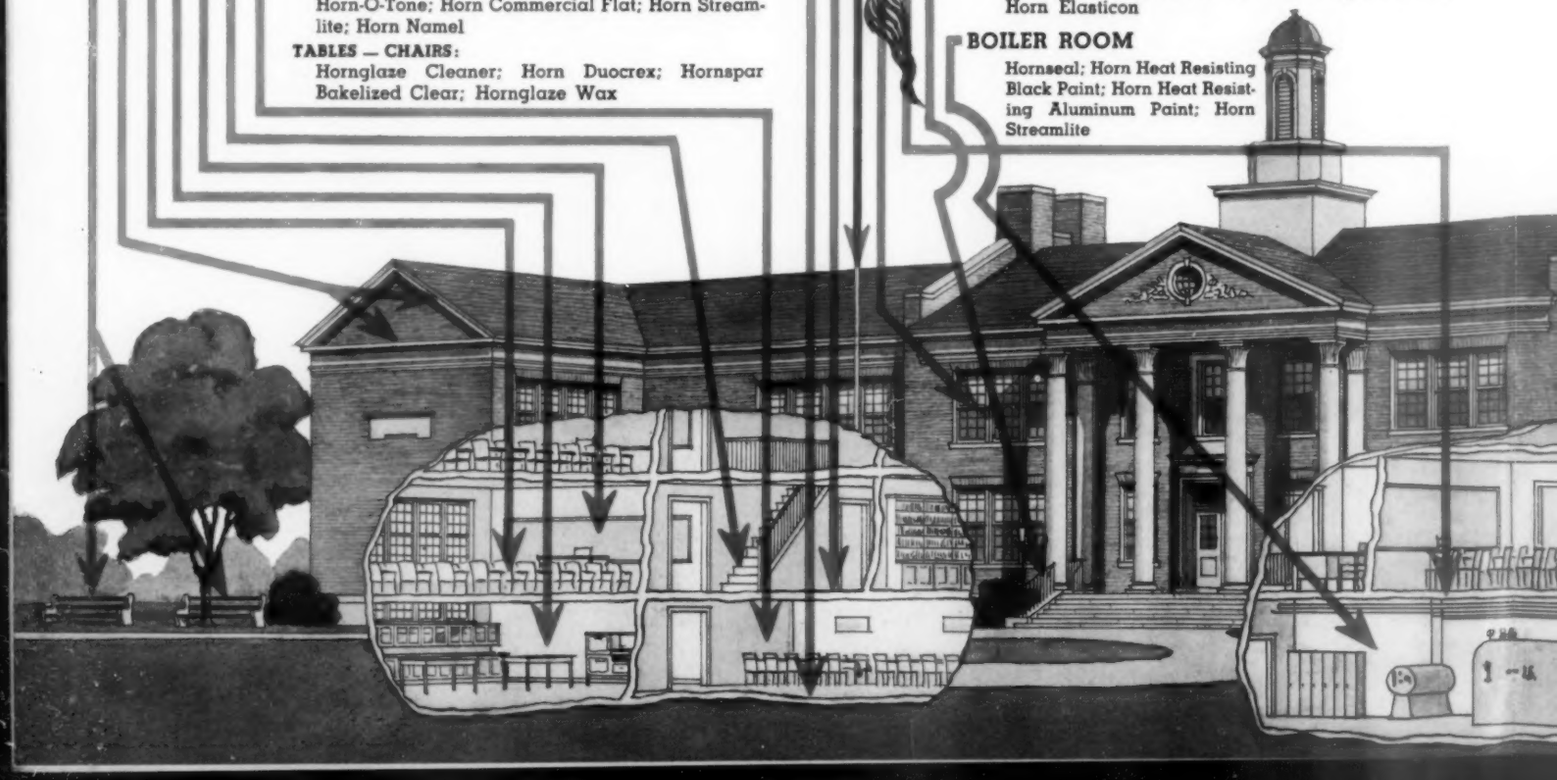
RUBBER: Hornglaze Cleaner; Hornglaze Wax

EXTERIOR METAL SURFACES

Horn Metal Primers; Horn Galvanide; Hornac; Horn Rexide; Horn Super Aluminum Paint; Horn Aluminum Paint No. 4017; Horn Graphite Paint; Horn Elasticon

BOILER ROOM

Hornseal; Horn Heat Resisting Black Paint; Horn Heat Resisting Aluminum Paint; Horn Streamlite



Protective and Decorative Coating Maintenance Requirement

PIPE SYSTEMS

Horn Galvanide; Horn Rexide; Horn Industrial Enamel; Hornspar Bakelized Enamel; Horn Super Aluminum Paint

RADIATORS

Horn-O-Tone; Horn Commercial Flat; Horn Super Aluminum Paint

CHIMNEYS OR STACKS

METAL:

Horn Heat Resisting Black; Horn Heat Resisting Aluminum

LABORATORY

Horn Suction Sealers; Horn Super Fume Proof Undercoater; Horn Super Fume Proof Enamel; Horn Acid-Resisting Table Top Coating

TOILET ROOMS

WALLS AND CEILINGS:

Horn Suction Sealers; Horn Super Fume Proof Undercoater; Horn Super Fume Proof Enamel; Horn Namel

SLATE PARTITIONS:

Hornlux

METAL PARTITIONS:

Horn Rexide; Horn Industrial Enamel; Horn Duocrex

EXTERIOR WALLS

Horn Suction Sealers; Horn Symentrex; Horn Sanicoat; Hornac; Horn RM Paint; Horn Dehydratine 2 - 2A

LOCKERS

Horn Locker Enamels; Horn Duocrex; Horn Varnishes

DAMPPROOFING

Horn Dehydratine No. 1; Horn Dehydratine No. 2-2A; Horn Dehydratine No. 3; Horn Dehydratine No. 4

GYMNASIUM

FLOORS:

Hornglaze Cleaner; Horn Florcrex; Horn Duocrex; Hornglaze Wax; Line Marking Paint

WALLS AND CEILINGS:

Horn Streamlite; Horn-O-Tone; Horn Sanicoat; Horn Super Fume Proof Enamel — Semi-Gloss; Horn Namel

PARAPETS

WALLS:

Horn Triple Flex Fabric; Horn Dri-N-Tite Liquid; Horn Dri-N-Tite Plastic; Horn Elastex Liquid; Horn Elastex Plastic

COPINGS:

Horn Sanicoat; Horn Dehydratine No. 2-2A; Horn Vulcatex; Hornlastic; Horn Symentrex; Horn Rexide

AUDITORIUM

WALLS AND CEILINGS:

Horn Streamlite; Horn Acoustical Surface Paint; Horn Suction Sealers; Horn-O-Tone; Horn Super Fume Proof Enamel; Horn Namel

FLOORS:

Horn PDQ Koncrex; Horn Concrete Floor Enamel; Hornglaze Cleaner; Hornglaze Wax; Horn Duocrex

WATER TANK

Horn Interior Tank Paints; Horn Metal Primers; Horn Galvanide; Horn Super Aluminum Paint; Horn Rexide; Hornac

STADIUM

Hornac; Horn Florcrex; Horn Floor Koter; Horn Rexide; Horn Sanicoat; Horn Symentrex

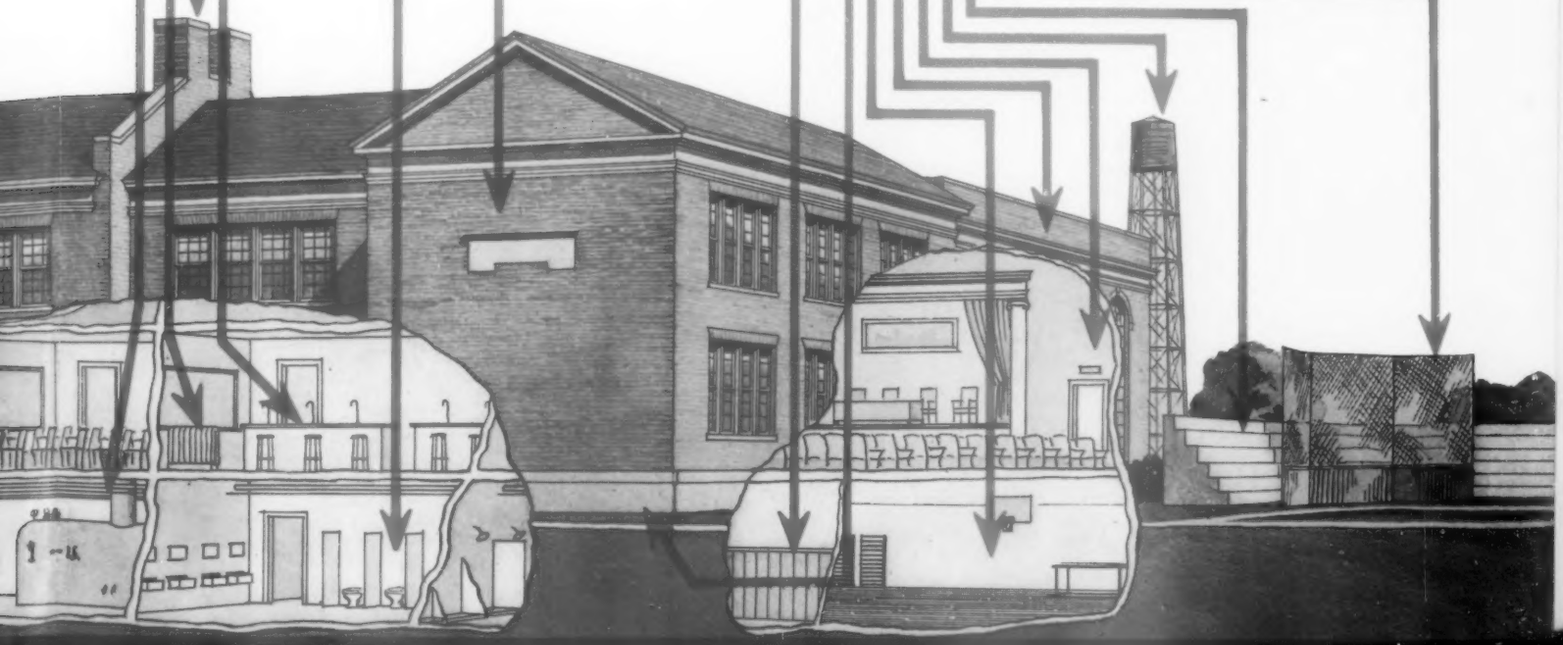
FENCES

WOOD:

Hornac Non-Penetrating Primer; Hornac; Horn RM Paint; Horn Rexide

METAL:

Horn Metal Primers; Horn Galvanide; Horn Rexide; Horn Super Aluminum Paint



1897...1940
This Famous Stamp

has been the emblem of honestly made materials... time tested and proved through more than four decades of service. It is a seal of the integrity of partnership which must exist between institution and manufacturer.

A. C. HORN COMPANY
Established 1897
Maintenance Sales Division
43-36 Tenth Street, Long Island City, N. Y.

THE AMERICAN CRAYON COMPANY

Manufacturers of a Quality Line of Floor Sealers and Finishes

Sandusky, Ohio

BRANCH OFFICES

New York, N. Y., 9 Rockefeller Plaza — San Francisco, Calif., 116 New Montgomery Street

Dallas, Tex., Santa Fe Building

• KAYSAN—THE PERFECT SEALER AND FINISH FOR EVERY HARD-SERVICE CONDITION

KAYSAN is manufactured by the makers of the first penetrating varnish developed for heavy-duty, hard-service wood floors. It is recommended without reservation for schools, stores, factories, offices, clubs, public buildings, apartment houses and similar types of buildings where wood floors receive excessive wear but must be attractive and in keeping with their surroundings.

quickly enough so second application can be put on about two hours after the first. In the case of a third application, this third application can also be put on about two hours after the second.

It is a very durable finish which does not water spot, crack or scale off, gather dirt like oil, scratch or mar, need wet scrubbing, nor increase the fire hazard.

It applies easily, seals the wood, prevents slipping, gives a lustrous finish and takes hard wear.

KAYSAN Has All These Remarkable Qualities

Brings out the full beauty of the grain to a remarkable degree.

Needs never be refinished, but can be repolished with one application of KAYSAN as often as wear requires.

Will not show laps but can be applied to traffic lanes without resanding and refinishing the entire floor.

Dries bone dry and may be polished by friction.

Withstands the hardest usage.

Easily cleaned—reduces maintenance to a minimum.

Reduces time and labor to minimum as it sets up

KAYSAN allows the wood to more nearly retain its natural wood appearance than any other finish.

Cost of Application

Its ease of application and minimum cost of maintenance, make cost of finishing with KAYSAN very economical.

Covering Capacity

Under average conditions, 1 gallon of KAYSAN finishes on oak, approximately 300 square feet with three applications; on maple, 400 square feet with two applications.

OTHER OLD FAITHFUL FINISHES

• FILTITE—An excellent sealer for old cement and similar surfaces.

• KAY-BRITE WAX (dries with a shine without polishing) and KAY-WAX Paste Floor Waxes.

• TRAZATITE—A Terrazzo sealer and finish.

• OLD FAITHFUL PRODUCTS

Backed by 105 Years of Successful, Expert Manufacturing Experience

1835–1940

OLD FAITHFUL

Also Crayons, Water Colors, Pencils, Inks, Pastes, and other OLD FAITHFUL Products

• Reg. U. S. Pat. Off.

THE HILLYARD SALES COMPANY

BRANCHES IN PRINCIPAL CITIES — St. Joseph Missouri — DISTRIBUTORS FOR HILLYARD CHEMICAL CO.

A National Maintenance Organization . . . Over Thirty Years Continuous Service

To protect our customers against imitations all Hillyard products are registered and trademarked and shipped in sealed, checker board designed containers

Super SHINE-ALL Trade-Mark Reg. is not a soap, but a Neutral Liquid Chemical Cleaner for all types of floors, also painted and varnished surfaces. It possesses 100% active cleaning units. SUPER SHINE-ALL cleans, polishes, and preserves in one operation, requiring no rinsing. Saves time and labor. Officially endorsed by leading floor manufacturers. The one cleaning material that is qualified for safe use on every description of floor or wall surface.

HIL-BRITE Trade-Mark Reg. Self-Polishing Water Emulsion Wax, dries bright without rubbing or polishing, with a hard traffic resisting finish, yet has that soft lustrous glow of polished wax. It saves time and labor, cuts your waxing and cleaning costs in half. Endorsed by National floor manufacturers.

ONEX-SEAL Trade-Mark Reg. gives positive protection and restores the original attractive finish to Terrazzo, Tile and Cement. Tests proved ONEX-SEAL capable of withstanding the most severe weather and traffic conditions. ONEX-SEAL produces a waterproof, weatherproof, dust resistant, sealed polished surface. Nationally recommended by flooring contractors and manufacturers.

TERRAZZINE Trade-Mark Reg. excels for thorough curing and sealing of new Terrazzo. Approved by the National Terrazzo and Mosaic Ass'n., and selected by them to treat the Century of Progress display:—"The Cascades of the Months." Economical and simple to apply.

PINE-O-CIDE, an amber colored liquid, is an efficient antiseptic and disinfectant. Compounded from pure double steam-distilled Pine Oil, it possesses a pleasant pine odor which is healing to the membranes of the nose and throat.

Pine-O-Cide is soluble in water, forming a beautiful milk white emulsion, possessing a phenol co-efficient of 5, "F.D.A." Method (report of Testing Laboratory furnished on request).

The use of PINE-O-CIDE promotes sanitation and combats the spread of contagious diseases in schools and public buildings.

HIL-GLO FINISH Trade-Mark Reg. is especially designed to serve on Class Room and Gymnasium floors. Universally used for the reclamation and preservation of wood floors in all types of buildings. HIL-GLO FINISH is supreme for wearing quality, is non-skid and does not easily rubber burn.

DIAMOND FINISH Trade-Mark Reg. produces a brilliant, long wearing surface, easy to apply with brush or mop. Quick drying and especially adapted for wood floors.

PENETRATING SEAL NO. 21. The purpose of Penetrating Seal is to SEAL the fibre against penetration of moisture, thus reducing warping, to seal against penetration of dirt, ink stains and moisture, to preserve the natural color of the floor, and provide a more permanent finish that is both beautiful and economical, to reduce maintenance costs.

Penetrating Seal No. 21 and Hil-Brite Self Polishing Wax is the ideal treatment for floors of class rooms, corridors, assembly halls, etc. This treatment preserves the natural color of the wood, is easily and economically maintained, and produces a durable and attractive finish.

HIL-TONE. Hil-Tone removes rubber burns and other marks from wood floors. It not only removes the marks easily when properly used, but also seals and protects the wood itself. The wood retains its light color and does not become oily or greasy as when ordinary dressings are used.

The seven story home of Hillyard Hi-Quality Products

WINDO-CLEAN. This lightning cleaner dissolves grime and removes dirt. No effort. No mess. No hard work. Eliminates buckets, sponges, water, squeegees and chamois, and makes glass sparkle.

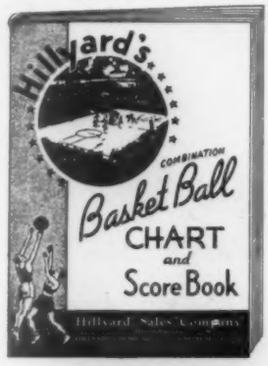
DUSTLESS SWEEPING BRUSH leaves a clean lustrous surface, absorbs the dust, saves labor. The wicks are detachable and washable.

Sizes 12, 18, 24, 36 inches

HILLYARD SALES COMPANY

...DISTRIBUTORS HILLYARD CHEMICAL CO. ... ST. JOSEPH, MO. ... BRANCHES IN PRINCIPAL CITIES...

FREE . . . FOUR VALUABLE HELPS



SUPER GYM FINISH produces a non-slippery, durable and sanitary floor, easy to maintain. Withstands hard and constant wear, gives proper reflection of light eliminating eye strain, insures a perfect non-slippery surface which will not rubber burn. Nationally used by leading Schools, Universities and Athletic Clubs, Private and Public Institutions.

HILLYARD'S WOOD PRIMER definitely seals and preserves, insures an ideal surface for the application of any desired finish or treatment. Universally used for the reclamation and preservation of wood floors in all types of buildings.

RENOVATOR. Hopelessly black and gummy floors can be brought out to look like new with Hillyard's Renovator. Oil-soaked wood floors can be scrubbed and bleached to a light color. The extra power in Renovator makes the toughest job easy.

HAND SOAP. Velva-San is shipped in concentrated form, insuring the customer of 100 per cent value in every gallon. Although usually shipped and prepared in its natural state, Velva-San may be had in various colors and perfumes. Velva-San provides individual hygiene used in our dispensers. It is a forward step toward eliminating sickness and disease spread by unsanitary bar soap.

VICTOR SOAP DISPENSER. Built substantially in modernistic design with frame of brass, chromium plated. The bowl of opalescent glass, hung in the frame on an eccentric balance, automatically rights itself, preventing loss of soap by drippage.

No springs to get out of order. A ball-bearing valve releases small amounts of soap.

Adapted to two positions, either upright or mounted on wall.

Note low, streamline construction, permitting use under desks and furniture.

You'll like the "LOW-BOY."

16-inch
For use in small buildings

19-inch
For medium work

22-inch
For heavy duty

HI-KO, a sodium hypochlorite solution, has an extremely high phenol co-efficient, yet can be diluted with water in large proportions and be effective as a sterilizer, antiseptic, germicide and deodorant. Hi-Ko—used in correct solution in a rubber foot bath tray, helps to rid showers and locker rooms of the troublesome germ which causes "Athlete's Foot."

HILLYARD'S NEW 20-IN. STEELTONIAN STEELWOOLING MACHINE.

Modern Floors demand modern maintenance methods.

The "Steeltonian" economically reconditions and maintains floors of wood, linoleum, asphalt tile, rubber, tile, etc.

Uses standard type of steel wool in ribbon form, which is easily applied. No expensive patented steel wool drums to buy. Built in 10 in. and 20 in. models.

The New Steeltonian 20″ *for heavy duty*

THE NEW HILTONIAN LOWBOY SCRUBBING AND WAXING MACHINE

Leads the field in utility, efficiency and economy, is a favorite with all users.

Speed, power and weight are co-ordinated to produce the utmost in service at a **minimum** of **effort** and **expense.**

Correct mechanical principles result in a machine that is perfectly balanced, silent in operation, easy to handle, steady and straight running.

The "HILTONIAN LOWBOY", being a "multiple brush" machine, does a better job in less than ordinary time and more easily.

A Brush for Every Need. Brushes that are available include Blassine, Tampico, Palmetto, Fibre, Steel Wool and Wire. There are also attachment plates to which sandpaper or burnishing pads can be easily fastened.

Write for descriptive literature and specifications. Our salesman in your territory will be glad to demonstrate.

J. I. HOLCOMB MFG. COMPANY

New York — Indianapolis, Indiana — San Francisco

"Cleaning Headquarters"

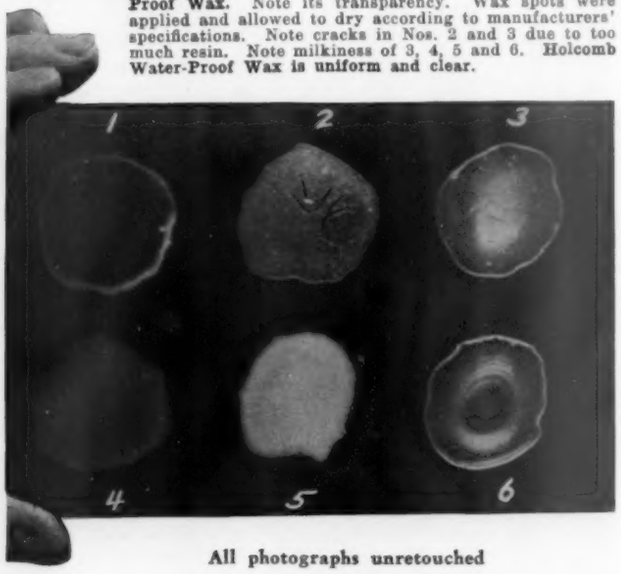
Holcomb

WATER-PROOF WAX *IS* WATER PROOF!

Its real protection against water spots and its self-polishing, lustrous surface, even after wet mopping, mean a yearly saving of hundreds of dollars in maintenance of school halls, cloakrooms and classrooms.

1. Scratched with an orange stick, the tough, resilient Holcomb Water - Proof Wax merely curled up —no cracking, no chipping. Look at No. 2—the brittle wax flew in all directions. No "give" to absorb traffic wear. You can't patch over chipping wax. Holcomb Water-Proof Wax patches perfectly.

Wax Spot No. 1 in each photo is Holcomb Water-Proof Wax. Note its transparency. Wax spots were applied and allowed to dry according to manufacturers' specifications. Note cracks in Nos. 2 and 3 due to too much resin. Note milkiness of 3, 4, 5 and 6. **Holcomb Water-Proof Wax is uniform and clear.**



All photographs unretouched

Now We're Ready for the WATER TEST

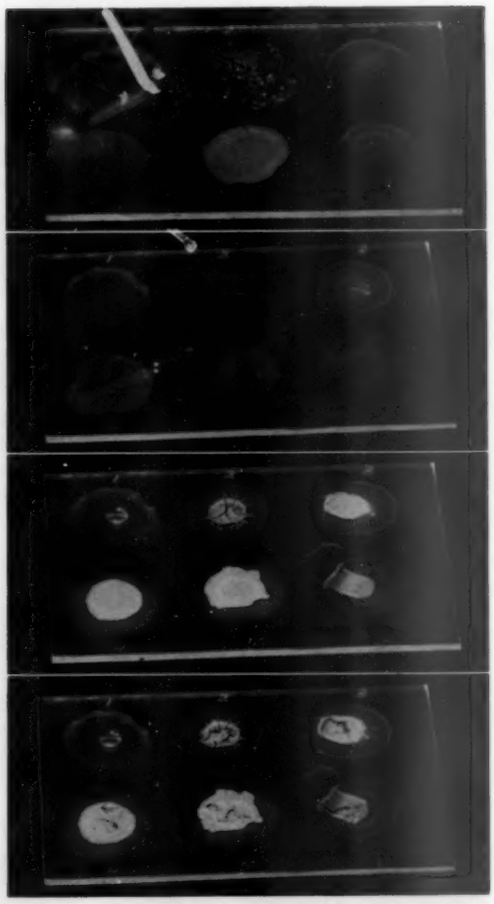
A. We are now ready to apply a water test to the completely dry wax spots. Only nationally known, high grade, competitive waxes were used in making these tests. Note cracks and clouds in Nos. 2, 3, 4, 5 and 6.

3 Minutes and 40 Seconds Later

B. Three minutes and forty seconds after city water was dropped upon the six spots, this photo was taken. Water has penetrated ALL FIVE of the competitive waxes. Water bead on Holcomb Water-Proof Wax remains on TOP of wax spot (No. 1). It has not penetrated the Holcomb wax. Holcomb Water-Proof Wax is **water proof** . . . not just water resistant.

All Waxes Loosened EXCEPT NO. 1

C. All spots were touched lightly with the orange stick to see if water had softened and loosened protective wax film. On spots 2, 3, 4, 5 and 6 the waxes loosened and floated on top of the water. No. 1 neither softened nor loosened. Holcomb Water Proof Wax can be wet mopped—water will not loosen it.



It Also LASTS LONGER

Reduces Number of Applications
Cuts Maintenance Time

Cut maintenance TIME and you cut maintenance **costs.** Water-Proof Wax is used on the Ford Rotunda because it lasts four times longer than ordinary water waxes under heaviest traffic. This results in fewer applications per year . . . ¼ as much applying time and ¼ as much material. This is your new "Customer Profit" when using Holcomb Water-Proof Wax.

—It's Self Polishing, TOO!

J. I. HOLCOMB MFG. CO. — **INDIANAPOLIS, INDIANA**

Holcomb School SWEEPERS

School maintenance men specified the floor brushes they needed to do a **better** sweeping job FASTER. Holcomb builds floor brushes to those specifications . . . to SPEED-UP the job . . . cut sweeping time . . . to get **all** the dirt the first time over. These tools make you a **new profit** . . . because each one is built to cut your maintenance time!

The PEKIN—for 30 years the School Leader
The CANTON—Smooth and Medium Floors
The MEMPHIS—for Medium and Medium Rough
The MASTER—(Illustrated) Smooth and Medium
The UNIVERSAL—All Surfaces
The MIAMI—Smooth, Tile, etc.
The BOSS—for Rough Floors, Cement, etc.
All in 12-14-16-18-24" Blocks

Holcomb SEAL COAT

Seal Coat **penetrates** and **combines with the wood** to form a hard, protective tread . . . does not build up on top of the floor. Heavy school traffic would have to wear off the wood to wear off Seal Coat! One gallon of Seal Coat plus one gallon of turpentine retreads 1000 to 1600 sq. ft. of floor . . . and keeps it like new. Save an hour a day on floor maintenance time with Seal Coat . . . make a **new profit** of $100.00 a year! (Labor at 40¢ an hour.)

Shipped in 55-30-15 and 5 gallon drums.

Holcomb PURITINE

Non Caustic Dirt and Grease Solvent

Goes 3 TIMES as FAR!

There is **one** cleaner for every school cleaning problem . . . PURITINE. Because it's 100% active and 100% soluble, Puritine goes 3 times farther than ordinary cleaning powders. Remove gummy oil and dirt . . . leave a non-slippery floor in halls and cafeteria. Grimy, ink-stained desks and furniture come clean with Puritine . . . **economically.** Blackboards . . . painted walls . . . glassware . . . are all cleaned safely, surely, swiftly with Puritine. It's a maintenance assistant you can't afford to miss!

325 lb. Bbls.; 150 lb. ½ Bbls.; 100-50-25 lb. Pails

. . . and the usual solution costs only "a Penny a Pail"?

Write for Sample Can

Test It Yourself—FREE!

Built to Do a Good Job FASTER!

HOLCOMB GYM FINISH
FLOOR MOPS
NO. 6 TOILET BRUSH
LIQUID WINDOW CLEANER
VITALIZED CLEANING COMPOUND
SODIUM HYPOCHLORITE

J. I. HOLCOMB MFG. CO. **INDIANAPOLIS, INDIANA**

MIDLAND CHEMICAL LABORATORIES, Inc.

Dubuque, Iowa, U. S. A.

FLOOR MAINTENANCE PRODUCTS

GYMLOH

Non-slippery Finish

FOR GYMNASIUM FLOORS

Midland Gymloh is prepared for use in treating gymnasium floors. It produces a surface finish which is non-slippery and is highly resistant to alcohol, boiling water, average stains, dilute acids and alkalies.

Gymloh contains Bakelite, a hard synthetic resin of the phenolic type. The use of Tung Oil in its composition adds qualities that can not be obtained with other oils.

Gymloh is also an excellent product for finishing tables, desks, chairs, etc.

MID-SEAL

Seal and Finish

FOR TERRAZZO, TILE, MARBLE, ETC.

Midland Mid-Seal is produced as a seal and waterproofer for terrazzo, tile, marble and floors of tesselated nature. It polishes to a beautiful lustre.

A Mid-Sealed floor retains its original attractiveness because the soil is prevented from penetrating and is more easily cleaned for the same reason.

Mid-Seal is an excellent aid in eliminating "dusting" of concrete floors.

LOHSEAL

Penetrating Floor Seal

FOR CLASSROOMS AND CORRIDORS

Lohseal, a penetrating wood seal, requires no preparation: Simply distribute Lohseal evenly on the floor with a lamb's wool mop. It seals the cracks and pores of the wood and keeps moisture and dirt from penetrating. This seal will dry over night.

After a floor has been treated with Lohseal it is in condition for a wax treatment.

EV-R-GLO

Water-resisting Wax

FOR MODERN FLOORS

A water-resisting emulsion wax produced from Prime No. 1 Yellow Carnauba Wax, the hardest natural Wax known—does not contain oils, paraffin or other ingredients harmful to colors or surfaces of modern flooring.

Ev-R-Glo is easily and quickly applied with a lamb's wool applicator and dries in less than 30 minutes with an attractive luster due to its durable and water-resisting qualities. Ev-R-Glo lasts longer than average emulsion waxes.

SOIL-SOLV

"Synthetic-soap" Cleanser

Midland Soil-Solv is a neutral liquid cleanser produced by combining a modern synthetic detergent with high quality soap. Soil-Solv has fast emulsifying action which gives it the properties of quicker cleansing and freer rinsing.

Soil-Solv can be used on practically all types of modern flooring with the exception of rubber. Soil-Solv is economical—only a few ounces are necessary to do a thorough scrubbing job.

MID-CEDAR DUST LAYER

For Daily Maintenance

The most satisfactory manner of maintaining finished or waxed floors is by "Dry Mop Sweeping." In this method a mop that has been treated with Mid-Cedar Dust Layer is used. This product contains cedar oil and is not greasy or sticky. It cleans and polishes the surface and reduces the scattering of dust and germs.

ASK YOUR MIDLAND MAINTENANCE SERVICE REPRESENTATIVES ABOUT OTHER MIDLAND FLOOR MAINTENANCE PRODUCTS

BASIC

Liquid Surgical Soap

A high quality concentrated Liquid Soap with a 42% anhydrous content . . . no added fillers.

This soap is prepared from Imported East India Cochin Cocoanut Oil, Imported Olive Oil and high quality Castor Oil. It is very economical to use since it may be reduced considerably with water and still retain its efficient cleaning qualities. Recommended dilution for average dispenser use 3 to 1. It is obtainable in the following odors: Bay, Lilac and Bouquet.

INSECTLOH

Insecticide

Midland Insectloh is rated an AA+ spray according to the Standard Peet Grady Test Method. This spray is very effective against cockroaches, flies, silver fish and other common insect pests.

Insectloh is easy to use and when used according to simple directions is stainless, non-explosive and non-poisonous. Insectloh is more efficient when used in an electric sprayer such as the Midland Models No. 300 or No. 304.

NEO GERMOLYPTUS

Disinfectant

In Neo Germolyptus we offer a product which, when used in the proper dilutions, has the following qualities:

High germicidal and antiseptic properties—non-irritating when used according to directions, except to allergic persons—Non-toxic—Non-corrosive to metal, rubber goods or enamel ware—Economical to use—Pleasant mild odor.

Neo Germolyptus may be used in sterilization of surgical and sick room equipment, rubber goods and for disinfecting linens in the laundry.

ATHALOH

For Foot-bath

This product is designed for use in the prevention and control of the spread of the infection commonly known as "Athletes Foot."

It can be used in the foot bath stepping pans or can be sprayed throughout locker rooms, shower rooms, etc. This is a chlorine product with an available chlorine content of 8%.

MIDLAND SUNSHINE PRODUCTS

SHILOH

PORCELAIN CLEANER

Stains and soil on porcelain and enamel ware are easily and quickly removed with Shiloh Porcelain Cleaner. This fine mild powder will not scratch or mar.

Shiloh is an effective combination of fine ingredients. The abrasive material is very finely powdered. Results are obtained without the usual hard rubbing.

Shiloh is packed in convenient 2-pound Shaker Top Cans.

FLUSHOLEUM

BOWL CLEANER

Midland Flusholeum (liquid or powder) has only one use, the cleaning of toilet bowls. It will remove heavy scale, rust stains, and discolorations—not recommended for use in cleaning enameled cast iron fixtures, such as bathtubs, sinks, etc. Flusholeum is not injurious to vitreous chinaware, and though it be used frequently, will not remove the glossy surface of this material.

LACQAIRLUSTR

POLISH

Lacqairlustr is an excellent non-buffing polish and cleaner for lacquered and varnished surfaces. Simply apply briskly with cheesecloth. The cleansing action of the solvent used in Lacqairlustr removes dirt and film quickly—cleans as it polishes. Lacqairlustr dries to a hard lustrous finish that does not fingermark or hold dust.

PIPEOLEUM

DRAIN PIPE CLEANER

When drain pipes become clogged, use Midland Pipeoleum. It will not injure the plumbing through which it passes; it attacks only waste matter such as paper, hair, congealed grease, lint, etc. Only commercially pure chemicals are used in the manufacture of this powerful dissolvent.

THE SELIG COMPANY, INC.

DALLAS ATLANTA NEW ORLEANS

Manufacturers of

Disinfectants — Insecticides — Sanitary Supplies

ESTABLISHED 1896

Library, Agnes Scott College, Decatur, Ga.
Asphalt Tile Floor finished with O-Brite-O

O-BRITE-O

Those desiring a really fine self-polishing wax will find O-Brite-O to be above the usual. O-Brite-O really dries with a shine. Because of its unusually high content of the finest number one pure Carnauba wax unadulterated by cheaper, inferior soft waxes; O-Brite-O, when dry, leaves a hard resilient long wearing surface. It is easily maintained and not only wears well but looks well. A trial will certainly convince you. O-BRITE-O IS SAFE TO USE ON ANY TYPE OF FLOOR.

VARNAWAX

A high grade wax of strictly number one pure refined Carnauba wax combined with certain varnish gums in an oil solvent vehicle. Varnawax produces a hard resilient, water proof surface that looks well and wears well. Varnawax requires polishing and may be used on all floors except asphalt and rubber or other floors harmed by an oil solvent.

SCRUBZOL

A strictly neutral linseed oil cleanser especially developed and approved for cleaning Wood, Linoleum, Cork, Asphalt Tile, Marble, Terrazzo, Travertine, Magnesite, Masonite and other similar floors. Scrubzol is a concentrated product thus permitting a little to go a long way and do a big job—satisfactorily and economically. Don't take our word for it. Try it and prove it to your own satisfaction.

VARNASEAL

You'll find the answer to your Terrazzo and Travertine problems in Varnaseal. Seal these floors against the entrance of dirt, grease, oil, stains and foreign matter with Varnaseal. It is easy to apply, makes maintenance easier and gives your Terrazzo or Travertine the kind of protection needed. Lower your maintenance costs with Varnaseal.

WRITE FOR OUR FREE 1940 FLOOR MANUAL

Below: Gymnasium, Lee Edwards School, Asheville, N. C.
Finished with Selig's JIM KOTE

JIM KOTE

A mighty fine, chemically balanced bakelite and tung oil gymnasium finish. Does not rubber burn, impervious to alkali, salt water, alcohol and common acids. Easily maintained. Plenty of traction. An ideal finish. Our numerous satisfied customers are, we believe, the best judges. Their complete satisfaction makes us believe you also will be pleased. Jim Kote is easily applied by the mopping method.

FLOR-O-SEAL

Especially developed for classroom use. This penetrating seal, when properly applied, does not leave a surface film. Thus, Flor-O-Seal does not show unsightly traffic lanes. It wears well, is easily maintained and is economical. The application is very easy and simple.

FLOOR MAINTENANCE SERVICE

The SELIG trained and experienced floor maintenance engineers are qualified to assist you in any problem of scientific floor finishing and maintenance. They will gladly assist you in setting up the proper and most economical schedule of maintenance. Please discuss your problems with us freely.

We manufacture a complete line of floor maintenance materials and equipment. Our various materials have been approved by the leading makers of flooring materials such as Wood, Linoleum, Cork, Rubber and Asphalt Tile, Marble, Terrazzo, Magnesite, Masonite, etc.

DISINFECTANTS — INSECTICIDES — LIQUID TOILET SOAPS

In addition to the famous line of floor materials, the name SELIG has been synonymous with the highest standards of Disinfectants, Insecticides, Liquid Toilet Soaps and Sanitary Supplies for over forty years.

Put your problems up to us and permit us to offer suggestions and advice. There's no obligation involved and it may be of mutual benefit. Write for our big free complete catalogue.

THE SELIG COMPANY, INC.

DALLAS ATLANTA NEW ORLEANS

Manufacturers of

Floor Finishes — Waxes — Cleansers — Polishes

ESTABLISHED 1896

WEST DISINFECTING COMPANY

42-16 West Street, Long Island City, New York

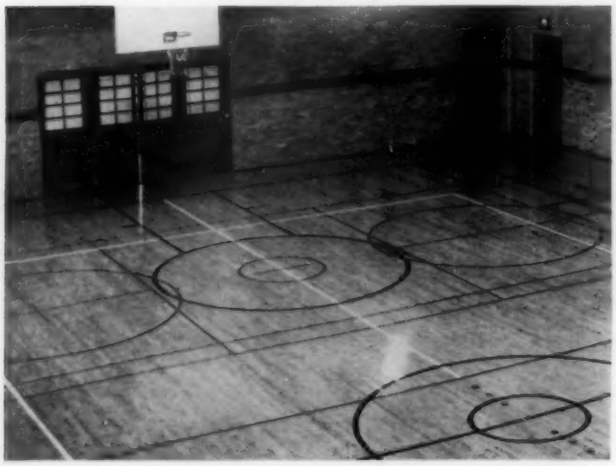
MANUFACTURERS AND DISTRIBUTORS OF

Liquid Soap Dispensing Systems **Toilet Tissues** **Kotex Vending Machines** **Cleansers**
Paper Towels and Cabinets **Disinfectants and Deodorants** **Insecticides** **Floor Finishes**

BRANCH SALES OFFICES

Albany, N. Y.	Dallas, Texas	Jersey City, N. J.	Oklahoma City, Okla.	San Antonio, Texas
Albuquerque, N. M.	Des Moines, Iowa	Kansas City, Mo.	Omaha, Neb.	San Francisco, Cal.
Baltimore, Md.	Denver, Colo.	Los Angeles, Cal.	Philadelphia, Pa.	Seattle, Wash.
Birmingham, Ala.	Detroit, Mich.	Louisville, Ky.	Pittsburgh, Pa.	Spokane, Wash.
Boston, Mass.	Evansville, Ind.	Memphis, Tenn.	Portland, Ore.	Syracuse, N. Y.
Buffalo, N. Y.	Ft. Worth, Texas	Milwaukee, Wis.	Providence, R. I.	Tacoma, Wash.
Chicago, Ill.	Hartford, Conn.	Newark, N. J.	Richmond, Va.	Toledo, Ohio
Cincinnati, Ohio	Houston, Texas	New Orleans, La.	Rochester, N. Y.	Tulsa, Okla.
Cleveland, Ohio	Indianapolis, Ind.	Norfolk, Va.	St. Louis, Mo.	Washington, D. C.
Columbus, Ohio	Jacksonville, Fla.	Oakland, Cal.	St. Paul, Minn.	

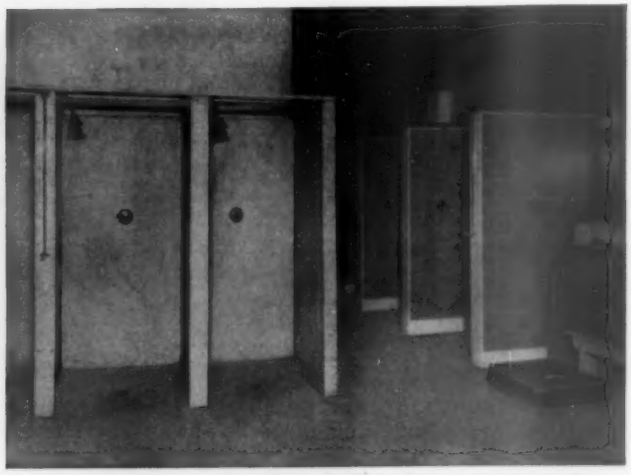
AND PRINCIPAL CITIES IN CANADA



LASTINCOTE

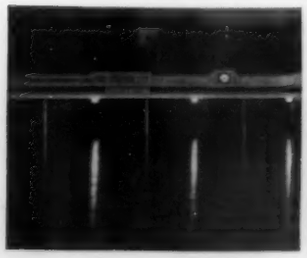
Floors stand the gaff better when they are finished with Lastincote.* Lastincote is a beautiful, hard, glossy yet non-skid finish especially prepared to stand up under gymnasium wear and tear, or subject to other heavy traffic. It is easily applied with a lamb's wool mop or brush. Lastincote is hard enough to help retard the action of rubber burns and scratches resulting from hard usage. Lastincote makes floors much more resistant to alcohol, body perspiration, alkali soaps, acids, boiling water, ink, oil, grease, salt or fresh water. Lastincote is a remarkable product which we believe stands in a class by itself.

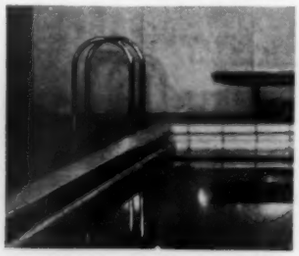
* Approved by Maple Flooring Mfrs. Assn.



WESTOCHLOR

The responsibility of doing something about helping to prevent the spread of Athlete's Foot, is clear cut—particularly since practical means tending to effective prevention are available. Westochlor is a disinfectant which, if used as directed, will help destroy the "Athlete's Foot" fungus. It can also be used to disinfect washrooms and locker room floors, dressing rooms, runways and diving boards. Westochlor will also help maintain your swimming pool in a sanitary condition. A West Rubber Foot Tray, filled with a solution of Westochlor, should be placed in the entrance to the shower room to help prevent the spread of this ringworm infection.



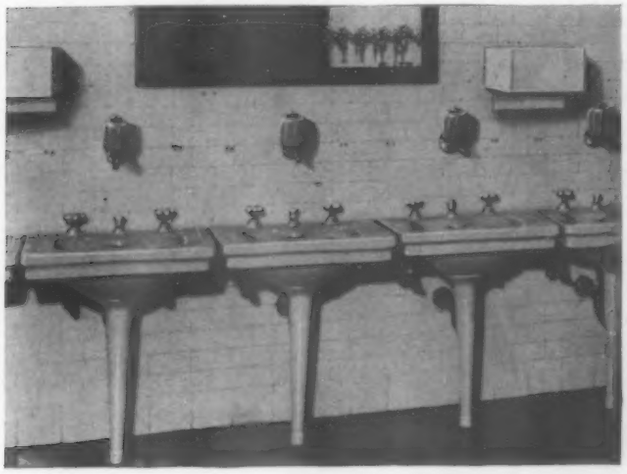


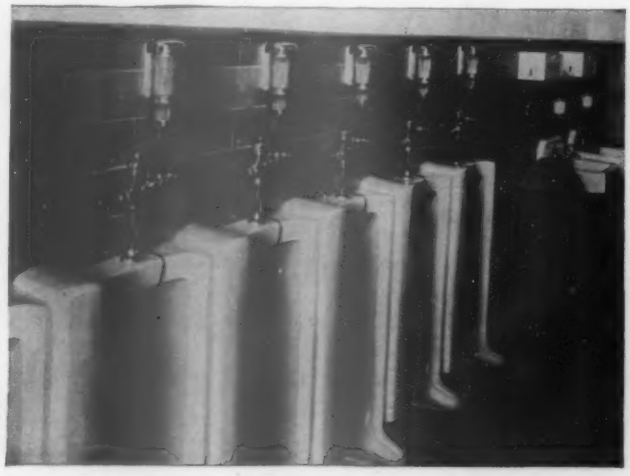
LIQUID SOAPS

West Liquid Soaps are uniform and of superior quality. Made of pure vegetable and coconut oils, the finished product is treated, aged and retested several times before leaving the factory. West Liquid Soaps tend not to irritate or dry the skin. Liquid Soap besides being sanitary and safe, eliminates waste of partially used cake soap which might be thrown or taken away.

DISINFECTANTS

An efficient method of deodorization in lavatories is the West Automatic Drip Machine. The special drip fluid spreads on the surface of the water, and helps overcome bad odors at the source. However, no matter how efficient automatic deodorization may be, the daily or routine use of a cleansing disinfectant such as Coro-Noleum on washroom floors, basins, seats, etc., is important.





LATHERATOR

The West Latherator introduces a new principal in liquid soap dispensing. Instead of merely dispensing the liquid soap to be worked into a lather by the user, the Latherator Liquid Soap Valve automatically agitates the soap into a rich creamy lather **before** it leaves the outlet. Pre-lathered soap washes 40% to 50% more hands than unlathered soap. This is a material saving in which you cannot help but be interested. Whether you require individual basin dispensers or a gravity tank Soaparatus system, you should compare costs between your present soap equipment and the West Latherator. For best results, Latherator Soap should be used with Latherator outlets.

PAPER TOWELS

The West Disinfecting Company manufactures a complete line of paper towels from fresh, clean pulp in its own mills. Standardized quality is obtained by expert scientific manufacturing control. West Towels are made in either Junior or Senior sizes and in 32 lb. or 38 lb. basic weights. In addition, the Tandem (double towel) is obtainable and is popular with institutions where costs are carefully checked. The Tandem Paper Towel is the closest approximation of a linen towel that West could design.

FREE

"Scope of Sanitation"

Write West Disinfecting Co., Dept. BU, 42-16 West St., Long Island City, N. Y., for free copy of this valuable booklet. It contains detailed information on these and many other products.

ADVANCE MACHINE COMPANY, INC.

Fourth Street S. E. at 26th Avenue, Minneapolis, Minnesota

ADVANCE ZEPHYR
Multi-Purpose
ELECTRIC
FLOOR MACHINES
for **SCRUBBING**
WAXING
POLISHING
and
STEEL WOOLING

Note how easily the Zephyr Lowboy Sixteen passes under a standard office desk

MADE IN FOUR SIZES:
SINGLE DISC— 12" and 15" brush spread;
DOUBLE DISC— 16" and 21" brush spread

Lowboy Twelve

Lowboy Sixteen

For the smaller schools:

The Advance Zephyr Lowboy Twelve and Lowboy Fifteen are single disc machines that give excellent service. These machines are extremely low over the brushes and do a thorough job of scrubbing, waxing, polishing and steel wooling. The machines are noiseless and simple to operate. They are constructed of high-tensile strength aluminum and are equipped with Timken roller bearings. Motors are standard vertical motors, with silent V-belt type drive. Each machine has the patented Advance aluminum brush holder to which brush segments are easily and quickly attached. Brush replacements are comparatively inexpensive. These two machines are built to give many years of uninterrupted service, and their worth has been proven by their use in hundreds of institutions throughout the country.

For larger schools and colleges:

The Lowboy Sixteen is the medium and popular sized machine, and is used in hundreds of schools, colleges and public buildings throughout the country.

The Lowboy Twenty-One is the largest of this line of superior floor machines, and is most commonly used for heavy-duty service.

Both models are powerful and speedy double-brush machines, silent and vibrationless in operation, with working parts totally enclosed, and of worm gear drive. The twin brushes revolve in opposite directions, eliminating side pull and assuring perfect balance and smooth operation. Brushes are quickly and easily changed. The brushes may be changed to alternate sides of the machine, thus insuring even wear and longer life.

We claim that these machines will outperform any other machine on the market.

Write for specifications

Lowboy Fifteen

Lowboy Twenty-one—Double disc, 21" brush spread—Used in hundreds of schools, colleges and public buildings

GENERAL FLOORCRAFT, INC.

333 Sixth Ave., New York City

The Low Cost Quality Line

GENERAL Floor Machines

A SIZE TO SUIT EVERY NEED AND BUDGET

The LOWTONE GENERAL

Single-Brush Floor Machine

(Illustrated at right)

POWERFUL—EFFICIENT—NOISELESS—The primary function of any electric floor machine is performance of its duties efficiently at lowest cost. More power and more speed assure efficiency and economy.

To obtain all these advantages, the **Lowtone General** single-brush, gear-driven electric floor machines are **correctly engineered** and designed, so that maximum motor power is actually utilized in performance of floor work. All gears are fully enclosed in grease leak-proof housing. No waste in complicated construction.

Lowtone General floor machines are powered by motors of rugged and modern design and have unusual quick starting action and reserve power. Perfect balance and simplicity of construction are features of this modern floor servant.

Made in 5 Sizes:— 11″, 13″, 15″, 18″ and 21″ brush diameter

- **MORE POWER**
- **MORE SPEED**
- **LOWER COST**

SPECIFICATIONS COVERING STANDARD LOWTONE MODELS

	Model S-11	Model S-13	Model S-15	Model S-18	Model S-22
Motor (Repulsion - induction)	¼ H.P.	⅓ H.P.	½ H.P.	¾ H.P.	1 H.P.
Brush Diameter	Full 11″	Full 13″	Full 15″	Full 18″	Full 22″
R. P. M. of Brush	170	170	170	150	150
Pressure on Brush Complete	45 lbs.	75 lbs.	90 lbs.	105 lbs.	140 lbs.
Cable Length	40 ft.	40 ft.	40 ft.	40 ft.	60 ft.

GENERAL "HOME MODEL" ELECTRIC FLOOR MACHINE

A light weight (18 lbs.), light duty all-purpose floor machine for homes and other small floor areas. Ideal for polishing and cleaning desk tops. Will get under all furniture. Extremely low price.

GENERAL TWIN-BRUSH "NOISELESS" FLOOR MACHINE

(Illustrated at left)

The **General** Twin-Brush Models were designed and developed to meet a very specific need—permanent quietness of operation, in schools and institutions where quiet is essential. These twin-brush models have no gears, no chains, no grease. They are driven by a series of heavy-duty multi-V belts and carry a permanent guarantee against noisy operation. They are even quieter in operation than the Single-Brush "Quiet" model, without sacrificing any mechanical engineering qualities that have made this "Quiet" model the choice of so many schools in the past. **Guaranteed Permanently Noiseless.**

Made in three sizes—14″, 18″ and 22″ brush spread

FREE TRIAL OFFER

The many advantages of the **General** line of floor machines may be seen on your own school floors. You can try a **General** before you buy one. Our representative will call to demonstrate, or, if you prefer, a ten-day FREE trial of any model can be arranged—without obligation to buy.

HILD FLOOR MACHINE COMPANY

1313 W. Randolph St. Chicago, Illinois

REPRESENTATIVES IN 48 STATES

Manufacturers of Floor Maintenance Equipment and Supplies

HILD System
FLOOR & CARPET MAINTENANCE EQUIPMENT & SUPPLIES

For SLIP-SAFE FLOORS . . . clean them the new quick-dry way! HILD SHOWER-FEED SCRUBBING with VACUUM PICK-UP

BANISHES SLIP HAZARD—Vacuum pick-up dries floors almost instantly. Leaves no slick film.

CLEANS MORE THOROUGHLY—Scrubs every square inch evenly. Vacuum pick-up completely removes dirty scrub-water . . . even from under baseboards and other inaccessible spots mops won't reach. Leaves no "squeegee marks", no "half-washed" streaks as in mopping.

CLEANS FLOORS OF ALL KINDS—Tile, brick, travertine, linoleum, rubber, wood, cement, etc. Lifts dirt and moisture from joints, seams, cracks and crevices or low spots.

SAVES THE FLOOR—Prevents rotting, warping or swelling of wood, cork or linoleum due to moisture remaining in cracks.

LOWERS SOAP COST—Gets floors cleaner with far less scrub-soap solution because every drop is put to work.

SPEEDS UP SCRUBBING—Scrub . . . then pick up dirty scrub-water instantly and completely. That's all! No rinsing, no mopping.

DOES MANY OTHER JOBS—HILD Equipment also performs dozens of other clean-up jobs like those shown on the opposite page.

"Match Test" Shows How Quickly Floors Dry

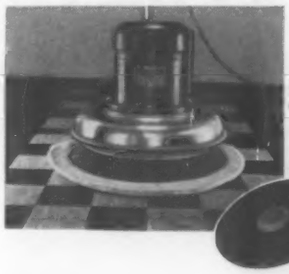
Scrub any hard-surfaced floor . . . follow with the Vacuum pick-up. Strike a match . . . it lights. That's how dry the floor is! Suction power strong enough to empty a two-gallon pail of water in 15 seconds, dries floors almost instantly . . . lifts moisture from deep cracks and takes the dirt with it. Go after muddy sludge, sand or lint . . . ¾ inch floor tool opening is large enough not to clog.

"Suds Test" Demonstrates HILD System Efficiency

With Shower-Feed Scrubbing, the cleaning solution passes thru scores of drip holes in channels between each row of bristles in the brush . . . every drop is whipped into cleansing, dirt-dislodging suds. Here's proof. Pour soap solution directly on floor, then run machine over it. Result—very little suds. Now run the *same* solution thru the Shower-Feed Brush. Result—plenty of suds! The Hild patented Shower-Feed brush does it!

WRITE FOR FREE DEMONSTRATION

Special attachment for sanding wood or cork tile.



Lamb's wool or felt buffer under waxing brush.

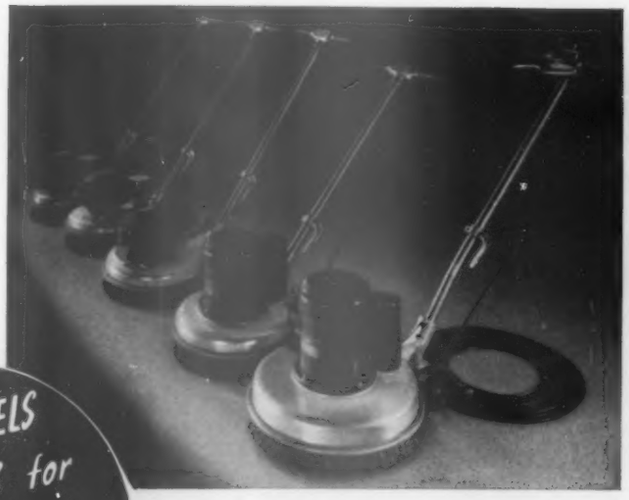
Special non-ravelling steel wool pad and holder.

SPECIFICATIONS—HILD Floor Machines
Five Models . . . Four Brush Sizes

Finest materials and workmanship used throughout. Chromium and polished aluminum finish. Safety switch and rubber bumpers on all models. 40-degree continuous duty GE Capacitor motors. No brushes or commutator to wear out. Built to stand an overload of 250 to 300%. Deliver more power with less current. Models "C" and "D" have "cushioned power" rubber mounting to absorb sound and vibration.

Model	Junior	Model "A"	Model "C"	Model "D"
Brush diameter	11 inch	14 inch	16 inch	19 inch
Motor Horsepower	¼	⅓	½	¾
Cable length	40 feet	40 feet	40 feet	50 feet
*Wt. (without tank)	54 lbs.	62 lbs.	98 lbs.	129 lbs.

* Where additional weight is required, machines weighing about 15% more are available with base casting made of cast iron instead of aluminum



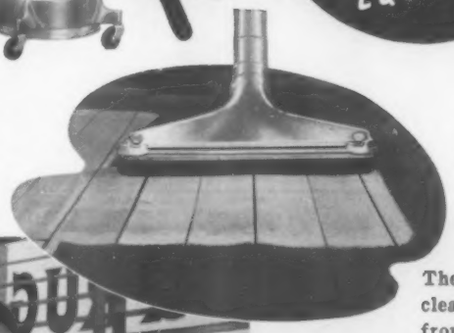
MANY MODELS MANY USES for HILD EQUIPMENT

HILD All-Purpose Vacuum Machines
Two Models—Specifications

Designed for fast, efficient work. Used for either wet or dry pick-up without adjustment or change of parts. Both models have the same power unit, differ only in size of Dust Arrestor Tank and Dust Filter Bag. Standard attachments, both models: 15-inch rigid floor tool, brass floor tool handle, upholstery tool, one 10-ft. length of 2-in. diameter hose.

Model 16—16¼ gallon brass (rust-proof) Dust Arrestor Tank mounted on four rubber casters. Filtering area of Dust Bag 1440 sq. in. Weight: 85 lbs.

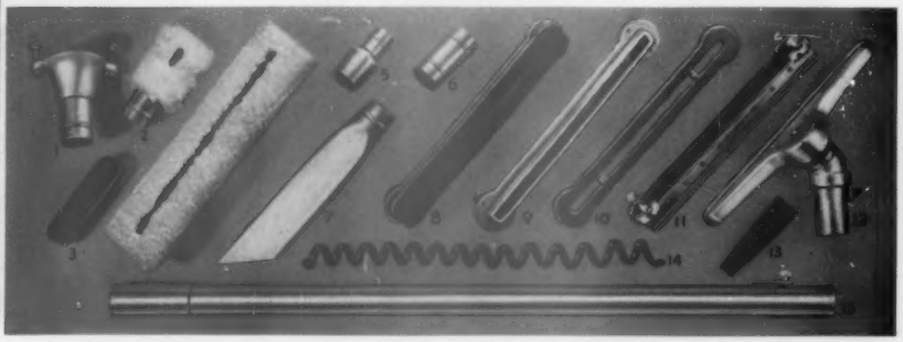
Model 55—55 gallon heavy gauge steel Dust Arrestor Tank mounted on three ball bearing casters and equipped with gate valve for emptying directly into drain. Filtering area of Dust Bag 2000 sq. in. Weight: 185 lbs.



Below — Dusting Venetian Blinds with lamb's wool Attachment No. 2 on Hild Vacuum

No sweeping compound needed, no cloud of dust when floors are swept with HILD Vacuum and Brush Attachment No. 8

These attachments equip HILD Vacuum Machines for many other jobs: cleaning walls, radiators, pipes, motors, machinery, etc.; removing dust from ledges and overhead beams; vacuuming rugs and upholstery; etc.



THE KENT COMPANY, INC.

174 Canal Street, Rome, N. Y.

BRANCHES IN PRINCIPAL CITIES

FLOOR MACHINES—For Thorough, Speedy School Floor Maintenance

The appearance of your school building is much improved by your floors kept in good condition and with the swift efficiency and economic methods of modern maintenance, it is easy to preserve and keep such floors looking their best. New types of floors requiring special treatment, as well as old floors, are speedily and thoroughly cared for by machines designed to do this work. There is a Kent Floor Machine for every size and type of floor. The increasing number of schools using these speedy efficient Kents over a period of 25 years testifies to their popularity for such purposes as scrubbing, waxing, polishing, buffing, sealing, and sanding. The Kent best seller to schools is the Model C15, shown below. This all-weight-on-the-brush machine combines the principles of the patented off-set motor design for perfect balance and ease of operation, straight-line drive for the minimum number of moving parts, automobile gear construction, fully enclosed dust and water proof motor, and patented adjustable safety-switch handle. These sturdy machines, made in five sizes, will give you many trouble-free years of service.

WATER PICK-UP—Equipment to Clean and Preserve School Floors

Added to the line of school maintenance equipment is the increasingly popular Water Pick-Up. This machine was designed to save cleaning time and to protect your floors and your investment in your floors. The dirty scrub water cannot be left to seep into cracks and crevices or to leave small dirt deposits to be ground into your floors after drying as was the case in the old method of mopping. Throw away your mops. You will cut down many hours of cleaning time, insure faster drying, and be confident your floors, even the cracks and crevices, are thoroughly clean with the modern principles of vacuum pick up. The Kent Water Pick-Up is an easily portable machine, has a powerful suction, and is built for servicing your school. You will be confident of cleaner floors, a better appearance to your building and easy disposal of the dirty, germ-filled scrub water in the shortest possible time.

SUCTION CLEANER—Vacuum Cleaning for Speed and Efficiency

Vacuum cleaning has replaced the old push-broom method of cleaning the school room. Dirt that was formerly pushed into little piles or scattered into the air to settle after cleaning is now vacuumed into a can to be taken up and out of the building. Maintenance hours are cut down and budgets, with the disposal of many required brooms. The Kent Suction is a small powerful unit, easily portable by one man into any part of the building. Dirt is suctioned up for complete disposal into a can which is easily removed by a slight twisting motion. Erasures are thoroughly cleaned by quick application to the hose, and draperies, shades, and library books are easily cleaned without removal. Sturdy build and twenty-five years' experience in their application insures minimum repair costs on these machines.

Fibre Scrubbing Brush for wood, linoleum and similar floors

Stiff Waxing Brush for waxing all floors

Soft Polishing Brush for polishing waxed floors

Steel Wire Brush for heavy scrubbing and refinishing

Lamb's Wool Buffing Pad for routine rejuvenation

Sandpaper Disc for sanding wood, cork and similar floors

THE KENT REPUTATION

has been built upon the satisfaction of thousands of users in all types of buildings in all parts of the world. One famous institution has more than 25 machines to take care of their needs (name on request). For over 25 years, KENTS have proved their quality by their performance.

Write for illustrated circulars giving further details

LINCOLN-SCHLUETER FLOOR-MACHINERY COMPANY, INC.

World's Manufacturer of The Most Complete Line of Floor Maintenance Equipment

233 W. Grand Avenue, Chicago, Ill.

Phone: Superior 8944

★ **44 YEARS OF SERVICE**

After nearly half a century of steady development, the Lincoln-Schlueter Floor Machinery Company still occupies a position of leadership in the manufacture and world-wide distribution of specialized floor maintenance equipment for schools and other educational institutions. The same ideals and principles laid down in the beginning by the founders of Lincoln-Schlueter Floor Machinery Company, exist today with equally full effect . . . to build better quality into Lincoln floor scrubbing, polishing and sanding equipment.

Your most exacting floor maintenance requirements can best be met by one of the more than 40 models in the Lincoln Line. Let us send our local floor maintenance engineer to give you a free floor maintenance appraisal, demonstrating the Lincoln machine best suited to maintain and protect your floors.

THE LINCOLN
MULTI-PURPOSE

5 Important Floor Maintenance Operations with One Machine

Adaptable to a wide variety of uses—all necessary to the proper preparation and care of school and university floors.

1. SANDS . . .

newly laid floors, or floors in need of refinishing, to satin-smooth surfaces.

2. WAXES and POLISHES

wood, linoleum, tile, marble, composition, concrete and terrazzo floors to bright, gleaming surfaces. Takes but a few minutes to change drums for each operation.

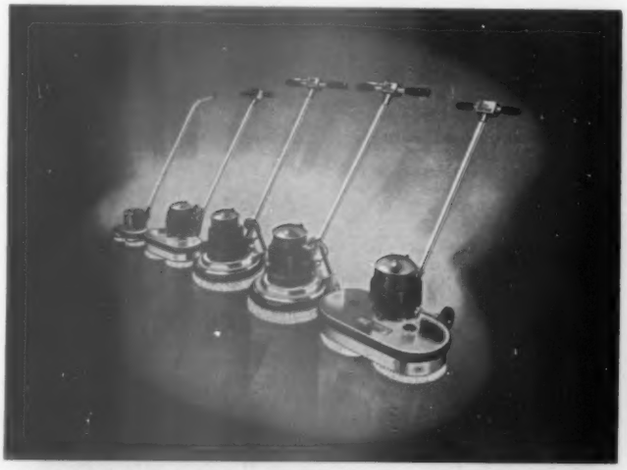
4. BUFFS . . .

3. STEEL WOOLS . . .

floors that have been oiled or sealed. Regular cleaning with steel wool removes all grit and dirt . . . maintains the lustre and beauty of waxed and polished floors.

5. BURNISHES SEAL

Distributors in All Principal Cities



From Left to Right—No. 11 No. 16 No. SD-15 No. SD-18 No. 20

LINCOLN SINGLE DISC AND TWIN DISC SCRUBBERS AND POLISHERS

Every classroom, hall, laboratory or gymnasium floor, however large or small, can be maintained better **at less cost** with these Lincoln single-disc and twin-disc scrubbing and polishing machines. Takes just a few minutes for our local maintenance engineer to show how Lincoln machines scrub wood, tile, linoleum, marble, terrazzo, asphalt-tile, cork, rubber and concrete floors spotlessly clean the first time over . . . how they polish to a high-gloss finish. Remember, your floors require a machine of the correct type and capacity to meet your special requirements. A letter or postcard today, can be the first step toward economy and efficiency in your floor maintenance program.

THE LINCOLN PORTABLE DUSTLESS DISC SANDER

For Desk and Table Tops—Stairs—Trim—Sills—Panels—Manual Training

Desk and blackboard sanding or maintenance is easy for your janitor or **handy** man with this streamlined portable sander. Doubles as manual arts shop equipment. Sands desk and table tops, trim, stair treads, panels, etc. LEAVES NO DUST.

Powerful suction captures all sand, grit and wood particles and "bags" them for disposal. Equipped with headlight for work in dark corners.

Weighs only 16 lbs.

GUARANTEE!

All Lincoln machines are guaranteed against defects in material or workmanship for a period of one year, on a repair or replacement of parts basis, if returned to us at Chicago, Ill.

Write Today for Descriptive Literature, Prices, Specifications and Demonstration!

G. H. TENNANT COMPANY

Established 1870

GENERAL OFFICE AND FACTORY

Minneapolis, Minn.

EASTERN SALES OFFICE: Westfield, N. J.

Oak floor beautifully maintained by the Tennant System — St. Mary's College and Academy, Monroe, Michigan

THE TENNANT FLOOR MAINTENANCE SYSTEM

For Wood Floors, especially those receiving heavy traffic — as in school buildings —

Dry cleaning dining room floor the Tennant way at Radcliffe College

SPECIFICATION FOR TREATMENT OF WOOD FLOORS

Floors shall be treated with two coats of Tennant No. 88 Floor Seal as manufactured by the G. H. Tennant Company, Minneapolis, Minnesota. This material shall be applied and burnished in accordance with manufacturer's directions.

SPECIFY THE TENNANT SYSTEM

The Tennant System consists, first, in filling and hardening the wood fibers by applying a penetrating seal which is immediately burnished in by a roll of steel wool revolving at high speed. This quickly produces a smooth, non-porous, non-slippery finish—in, not on, the wood. The floor is then ready for use. Dirt does not penetrate even under the traffic of many footsteps. **Hardening** and **sealing the wood fiber** and **eliminating the use of water** are the main reasons for the success of the Tennant System.

Wood floors treated and maintained by the Tennant Method are bright, clean, attractive and light-reflecting.

Cork Carpet and Cork Tile also benefit greatly from use of Tennant No. 88 Floor Seal. Several coats of this penetrating seal, followed by burnishing, will protect cork flooring from excessive wear in traffic lanes.

Asphalt Tile and Linoleum Floors are finished most satisfactorily by waxing. Use of a polishing brush for daily sweeping protects these floors against constant soap and water scrubbing which would dull the lustre. The continuous use of the polishing brush brings out the natural lustre of the oxidized oils in the linoleum and this gloss is more attractive and durable than that obtained even by wax treatment.

ONE TENNANT MACHINE DOES THE WHOLE JOB OF FLOOR MAINTENANCE

The Tennant System is used throughout the country in schools and colleges—where floors receive heavy traffic. The Tennant System will give a unified maintenance plan for the care of all floors, based upon preservation of the floor as well as cleaning it. ONE machine will do the entire job of original treatment and all subsequent maintenance.

SPECIFY TENNANT MAINTENANCE EQUIPMENT

Many school architects specify that a Tennant Floor Machine be purchased and used for the original treatment of the floors, then left in the building for permanent maintenance of the floors. Thus floors are maintained perpetually in as good condition as when originally treated.

WHEN SELECTING A FLOOR MACHINE, ASK THESE QUESTIONS ABOUT IT:

1. Does it use factory-made, uniformly compressed steel-wool buffing rolls ready for immediate use? Steel wool in cylindrical form stays clean and sharp because centrifugal force throws dirt and dull wool away from the cutting surface.
2. Has it the correct speed for both buffing and sanding?
3. Has it the proper direction of rotation for either buffing or sanding?
4. Can it operate flush with the wall?
5. Does it serve equally well for both wet and dry floor work?
6. Can its attachments be changed quickly and without use of tools?
7. Is it simple and easy to operate?
8. Does it have a vacuum?
9. Can it clean very dirty heavy-traffic wood or asphalt tile floors without use of water?
10. Can it polish an asphalt tile floor without wax?
11. Where waxing is necessary, does it apply and polish wax in one operation?
12. Will its use improve the floor?

TENNANT FLOOR MACHINE Model C

This machine can be used with 8" or 16" steel wool rolls, 8" sanding drum, 16" scrubbing or polishing brushes for:

Dustless Dry Cleaning
Sealing and Burnishing
Dustless Sanding
Scrubbing
Polishing
Waxing

Model C is ideal for use in most schools. Larger and smaller machines also available.

Please write for free demonstration or names of users in your vicinity.

THE MURALO COMPANY, INC.

Decorative Wall Coatings, Casein Paints, Calcimines, Texture Paints Water Paints, Wall Paints, Cement Paints, Wall Sizes and Patching Plasters

576 Richmond Terrace, Staten Island, N. Y.

Cambridge, Mass., 200 First Street
Chicago, Ill., 2624 W. Lake Street
Los Angeles, Calif., 2461 Porter Street
San Francisco, Calif., 447 Hampshire Street

NATION WIDE DISTRIBUTION

MURAL-TONE — A CASEIN WALL AND CEILING PAINT IN PASTE FORM

Mural-tone meets every decorating requirement—speed, beauty, economy, and durability. It is a high grade casein paint made according to a scientifically balanced formula. The principal pigments used are remarkable for their extraordinary opaqueness and brilliance. The clear, colorless, vehicle, compounded from casein, is characterized by toughness of film, strong adhesive qualities and non-yellowing properties—insuring clarity and permanence of color.

Once Mural-tone is applied the film remains in sound condition and at any future time it, or any other decorative material, can be applied without any treatment of surface.

Ideal for Unseasoned Plaster and Masonry

Mural-tone can be applied to fresh (not soaking wet) unseasoned plaster and masonry immediately after they have hardened (usually 48 hours), as it possesses the right degree of porosity to permit the escape of moisture and the free passage of air essential to the proper curing of the surfaces. All colors are permanently limeproof and alkaliproof. For *new* construction or *old* surfaces we believe there is no finer paint.

Mural-tone Exceeds Government Specifications

Mural-tone conforms to—in fact exceeds—the requirements for casein paste paint set forth in Federal Specifications TT-P-23 for Casein Binder Cold Water Paint, Grade B, Type 2, issued by the U. S. Government.

Special Advantages

(1) Beauty—Rich, matte finish, clear in tone.

(2) Speed—Dries in less than an hour, permitting two-coat work, if necsessary. Has no unpleasant paint odors.

(3) Economy—No costly thinners necessary. Permits savings in time and labor.

(4) Remarkable Opacity—One coat covers and hides on most surfaces.

(5) Exceptional Coverage—One gallon of paste thinned to brushing consistency will make 1⅓ gal. of paint, covering and hiding (depending upon surface conditions) as high as 1000 sq. ft., one coat, as shown by the following:

Smooth plaster	750 to 1000 sq. ft.
Oil or flat oil painted surface	750 to 1000 sq. ft.
Plaster board	450 to 600 sq. ft.
Rough concrete	300 sq. ft.
Brick	350 sq. ft.
Insulating board	250 sq. ft.

(6) Intense Whiteness—A brilliant white that will not yellow with age, and clear tints that will retain their color indefinitely. Exposure to strong light or darkness will not cause fading or graying. Acid fumes, vapor and heat will not affect it.

(7) High Light Reflective Value—Due to the high index of refraction of the pigments used in manufacture, in combination with clear, colorless casein vehicle, Mural-tone rates a high light reflective value—white averaging 90% plus.

(8) Cleansable—Water, a mild neutral soap and soft sponge are all that are necessary to clean the painted surface.

Colors

Color range includes a brilliant white, 10 beautiful tints, 17 Mural-tone Positive Colors and black. An endless variety of tints can be easily obtained by intermixing or tinting. Intermixing and tinting charts will be sent you on request.

Mural-tone Positive Colors—Finely ground, concentrated colors in casein vehicle, especially developed for tinting regular Mural-tone white and other casein-vehicle paste paints.

Positive Colors can also be used full strength, alone or intermixed, where strong, brilliant effects are desired. Because of their high tinting strength are very economical. They produce clear tints of unusual brilliancy.

MURAL-TONE MASONRY PAINT

A Masonry Paint in Paste Form for Exterior and Interior Surfaces

Mural-tone Masonry Paint is designed for the decoration and protection of outside and inside masonry surfaces, particularly concrete, stucco, brick, stone and other similar surfaces. It possesses superior weathering qualities, high opacity and remarkably easy brushing and application. It may be applied to "green" concrete as well as directly to "green" plaster. It may also be applied over oil paint which is in good condition, and adhering firmly. Oil paint may be applied over Mural-tone Masonry Paint.

Mural-tone Masonry Paint may be applied over surfaces which have been painted with cement paint, provided that the cement paint is in good condition. Like other Muralo Products, it is prepared for use by simple and easy thinning with water (½ gal. to 1 gal. of paste), and of course involves no fire hazard. It dries to the touch in approximately one hour, and may be recoated the next day. Under reasonably good conditions, one coat is adequate although usually two coats are recommended.

You will at once recognize the versatility and usefulness of this remarkable paint; formulated and built to a standard and quality previously unknown in the Water Paint Field. Upon basis of performance, it is one of the most economical paints obtainable. It comes in 8 tints, and white.

Coverage—One gallon of paste thinned to brushing consistency will make 1½ gal. of paint, covering and hiding (depending upon surface conditions) as high as 850 sq. ft., as shown by the following:

Primed plaster surface	750 to 850 sq. ft.
Untreated brick or cement surface	300 to 400 sq. ft.

SPACKLE SURFACING COMPOUND

Properly prepared surfaces mean perfect paint jobs that give lasting satisfaction. Spackle is an efficient repair material for filling cracks, holes, dents, joints, and rough grain, and for building up surface irregularities before painting and decorating interior surfaces. It dries quickly to a smooth, hard snow-white surface, sands easily and takes any decorative coating perfectly.

Spackle is packed in handy dry powder form and is made ready for immediate use by the admixture of water. Varnish, white lead or colors-in-oil may be added to make the old-fashioned Swedish Putty.

USED IN MANY NOTABLE SCHOOLS

Leading master painters and the operating Heads of schools the country over have used Muralo Process Paint Products for years in the maintenance of important buildings of which the following are typical:

Bryn Mawr College
Sarah Lawrence College
Princeton University
University of Cincinnati
University of Rochester
Woodbury's, Los Angeles
University of Minnesota
Union County Vocational School
University of Miami

UNITED LABORATORIES

INCORPORATED

MAINTENANCE RESEARCH

Executive Offices: Euclid at Ivanhoe, Cleveland, Ohio

ASSOCIATED OFFICES IN PRINCIPAL CITIES

THE maintenance of property is a specialized job and should not be delegated to one who can devote only spare time to it. There is a most confusing list of maintenance products from which to choose. There are right and wrong ways of applying them. There are annoying problems to be solved.

For eliminating maintenance guesswork, we suggest United Laboratories. A combined maintenance experience of over a century is behind us. The personnel includes individuals of widely varied experience whose composite advice and service is available without charge or obligation. The products recommended by United Laboratories are tested, approved and certified before being offered to our clients. You are told what they will do, what they **will not** do, and how you can get the longest service from them. You are never asked to experiment at your expense.

Maintenance problems and their solution is our life work. We serve more than 50,000 clients through our 170 Field Associates who operate from our 10 Associated Offices.

PLASTIC ROCK

"Your Old Floor on Saturday Is a New Floor on Monday"

Plastic Rock comes to you in complete units. Each ingredient is sealed in its own container in proper proportion. Add water on the job and you have a mastic of the consistency of mortar. This mastic is spread from ⅛" to ½" deep over your rough, worn, broken or cracked concrete or wood floors. It is troweled to a smooth finish and allowed to dry. Is used for patching as well as complete floor covering.

When dry, Plastic Rock is flexible, dustless, waterproof, slip-proof, and as silent as rubber-soled shoes. It deadens sound, cannot splinter, crack, curl or loosen from the base. **It is absolutely fire retardent** because it is composed of inert materials. Colors if desired.

Hundreds of schools and colleges have eliminated the expense of removing old floors in corridors, halls, wash rooms and locker rooms by installing Plastic Rock. It is 100% skid-proof, wet or dry.

Laboratory Report 220 and illustrated folder will be mailed without charge or obligation.

STAIR TREADS: Worn stair treads and landings can be beautifully surfaced with Plastic Rock in a few hours' time. Absolutely skid-proof, wet or dry.

Plastic Rock Units are shipped complete. Simply add water and mix

The Plastic Rock mixture is spread and then troweled to a smooth finish

The resulting surface is quiet, flexible, sanitary, slip-proof and easily cleaned

Plastic Rock, explained above, is one of more than 100 products specified by United Laboratories. We specialize in roofs, floors, waterproofing, dampproofing and caulking. We supply special paints and coatings for resisting rust, heat, abrasion, fungus, termites, acid, brine, alkali, gas fumes, etc. Explain your problem to us. We may be able to offer a low-cost, efficient solution. Ask for a free copy of our Maintenance Checking Chart

THE SPENCER TURBINE COMPANY

Hartford, Connecticut

THE SPENCER CENTRAL VACUUM CLEANING SYSTEM

The Spencer Central Vacuum Cleaning System has met with the approval of architects and engineers everywhere, and has been installed in more than 10,000 buildings, including more than 1500 school buildings.

Spencer Central Vacuum Cleaning is a permanently installed system for the speedy and complete removal of dirt and dust from all kinds of floors, walls, ceilings, furniture and other building equipment. It consists of five essential parts, each carefully selected to meet the special requirements for each individual building:

1. A vacuum producer, located in the basement. 2. Inlet valves, conveniently located on all floors and piped to vacuum producer. 3. Specially designed, entirely enclosed, and easily cleaned separator. 4. Light weight, flexible hose. 5. Special vacuum tools for each operation.

Advantages—In exhaustive tests in leading schools, the powerful vacuum, scientifically applied with correct tools, has demonstrated its ability to remove more of the dirt in less time than other methods.

Because the equipment is simple in design, requiring little attention and because these systems are built to provide satisfactory service over long terms of years, both the operating and amortization costs are extremely low.

One janitor can clean twelve average sized class rooms in two hours with a 3 Hp. Spencer System. The Spencer elbow joint makes cleaning around furniture easy.

For Cleaning Erasers and Chalk Trays—Spencer Vacuum Cleaning, instead of scattering the great bulk of the chalk dust on the floor, provides a method of cleaning erasers and chalk trays that is rapid, sanitary, easy and thorough. The janitor has only to attach a special tool and move it across the surface of eraser or chalk tray.

Cleans the Boiler Room—Spencer Vacuum cleans boiler room floors—removes dust and soot from pipes and draws soot out of the boiler tubes, often saving the whole cost of operation in this one item alone.

Swimming Pool Cleaning Equipment—By means of special cleaning tools usually employed in connection with the pump on the filtering system it is possible to remove accumulated sediment from swimming pools without the waste of water involved in draining the pool. Bulletin on request.

SPENCER PORTABLE VACUUM CLEANERS

The Spencer ⅓ Hp. Portable Vacuum Cleaner shown above weighs only 34 pounds. The ¾ hp. unit shown below weighs 150 pounds. Both are built on the same principles of design as the larger Spencer units, and use the same vacuum tools. Easy to clean, easy to use, and built for long life service.

ALLAN J. COLEMAN

Manufacturers of Sewer, Pipe, Closet and Drain Cleaning Tools

120 W. Illinois St., Chicago, Ill.

Flexible Closet Cleaners

COIL WIRE CLOSET CLEANER

Instantly removes obstructions from water closets, drain pipes, etc.

Grade A

C-510-515. Flexible Coil made of a special prepared non-corrosive **Swedish Spring Steel Music Wire No. 12 gauge, ½" size,** with removable corkscrew and cone wire.

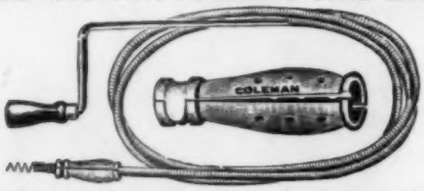
C-510—3-ft. Music Steel Wire Spring $4.50
C-515—6-ft. Music Steel Wire Spring 5.50

Grade B

Made of good oil-tempered steel, 12-gauge wire ½-in. size.

C-516—3-ft. coil, black enameled... $3.50
C-517—6-ft. coil, black enameled... 4.50

FLEXIBLE COIL WIRE SEWER AND PIPE AUGERS WITH AUTOMATIC GRIP HANDLE



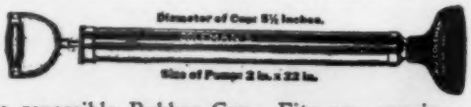
For use in removing obstructions in vacuum, drain pipes or sewers. Made of the best oil-tempered spring steel, and are flexible, enabling them to turn bends and go through traps. Made with cork-screw and handle complete, also furnished with automatic grip handle.

Style No.	Size, Ins.	6-Ft. Lgth.	9-Ft. Lgth.	15-Ft. Lgth.	25-Ft. Lgth.	50-Ft. Lgth.	100-Ft. Lgth.
C-520a	3/16"		$1.25		$2.25	$3.80	$6.80
C-520b	¼"		1.55		2.70	4.25	7.65
C-520	⅜"	$2.00	2.70	$4.50	6.75	10.20	17.00
C-525	½"	2.25	2.90	4.95	7.20	12.75	21.25
C-528	⅝"			5.85	8.10	13.60	25.50

		Price
C-530—¾",	10-ft. sec., hdl. and corkscrew	$5.50
	Extra 10-foot section	5.00
C-535—1",	10-ft. sec., hdl. and corkscrew	6.50
	Extra 10-foot section	6.00

Nos. 530 and 535 are furnished with handles and corkscrews and all connections. Made in 10-foot sections.

BRASS SUCTION AND FORCE PUMP

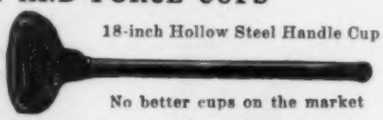


Large reversible Rubber Cup. Fits any opening up to 5 inches. Wonderful article for opening sinks and drains.

C-500—Pump with Cup. Weight, 6 lbs. ..... Each $12.00
C-505—Cup only. Weight, 1 lb. ..... Each 1.50
C-508—Graphite packing rings ..... Per set 1.50

SUCTION AND FORCE CUPS

High grade rubber. All handles secured to Cup by threads and sockets.



18-inch Hollow Steel Handle Cup

No better cups on the market

Style No.	Size, Ins.	Color	Wood Handles, Ins.	Price Per Doz.
C-545	5½	Red	Steel 18	$24.00
C-550	5½	Red	Cup Only	18.00
C-555	5½	Red	Wood 30	15.00
C-560	5½	Black	Wood 30	12.00
C-565	4½	Red	Wood 30	9.00
C-570	4½	Black	Wood 30	7.80

Giant Revolving Sewer Cleaning Spear Points and Root Cutters

For cleaning out straight sewers or drains. Made of a special oil-tempered, flat spring, steel wire. Equipped with spear point, roller ball and grip handles, which increases efficiency. Use either end.

Style No.	Size, Ins.	25-Ft. Length, Each	50-Ft. Length, Each	*75-Ft. Length, Each	*100-Ft. Length, Each
C-532	⅛ x .030	$1.25	$1.75	$2.50	$3.50
C-534	3/16 x .030	1.50	2.50	3.50	4.50
C-536	¼ x 1/16	1.85	3.50	5.00	7.00
C-537	½ x 1/16	2.40	4.50	6.00	8.00
C-538	¾ x 1/16	4.00	6.00	8.00	10.00
C-539	¾ x ⅛	6.00	8.40	12.00	16.00
C-539a	1 x ⅛	7.00	10.20	13.80	18.90
C-540	1¼ x ⅛	7.20	10.80	14.40	20.00
C-542	1½ x ⅛	8.40	12.00	18.00	24.00

* Furnished with Frame. Other lengths, 75 cents extra.

CONDUITS AND SEWER RODS WITH NEW FRICTIONLESS COUPLING

C-543—COLEMAN'S SECTIONAL SEWER AND CONDUIT RODS are made of the best grade of 1⅛" hickory, 3 ft. or 4 ft. lengths, coupled together with Coleman's latest Most Improved "FRICTIONLESS" 1⅛" Certified Malleable Iron Couplings.

Experience has taught us that there is a great amount of friction and drag caused by the Couplings and Rod dragging flat on Pipe.

Repeated tests have caused the development of COLEMAN'S "FRICTIONLESS" COUPLING. Rods touch on four wings or planes on our Improved "FRICTIONLESS" Coupling eliminating this friction and drag to a minimum.

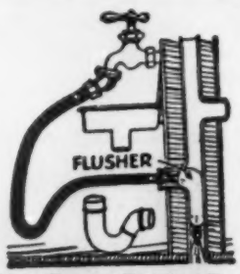
A Heavy Duty Sewer Rod

C-543—Rod with couplings 1⅛" x 3', wt., 2 lbs. $1.10
C-543a—Rod with couplings 1⅛" x 4', wt., 2¾ lbs. 1.20
C-625—Rod with couplings ⅞" x 3', wt., 1½ lbs. ..... .90
C-675—Rod with couplings ⅞" x 4', wt., 1¾ lbs. 1.00

Tools for Above Rods. Write for Prices

HYDRAULIC FLUSHER

House Faucet Connection. Standard Size of Flusher for House Plumbing That Gives Results.



This Sewer Flusher is made of several plies of water-tight heavy rubberized fabric which makes it Strong, Durable and Flexible, easy to insert into traps, vents, curved sewer drains or pipes. A very efficient article when it is necessary to wash out pipes or sewers. When connected with strong water pressure, flusher is expanded to size of drain, thereby giving a direct water pressure close to stoppage. Sizes to fit all pipes. Write for prices.

"GUARD HEALTH" By Using COLEMAN'S Tools to Keep Sewer Drains Running Freely and Have Sanitary Buildings

SECTION V
LANDSCAPE DESIGN AND DEVELOPMENT

MAINTENANCE OF SCHOOL GROUNDS

A Landscape Architect's Suggestions

By THOMAS H. DESMOND

Landscape Architect, Simsbury, Conn.

THE effects of good planning of the school or college campus may be greatly enhanced or largely nullified by the type and character of maintenance which follows the initial construction, grading, and planting. Buildings, when properly designed and honestly built, require only routine care to preserve their physical condition—their design is a completed thing. This is not true of the grounds which surround the building. They may have been planned by the most competent landscape architect, with a full technical knowledge and a thorough understanding of the requirements of each particular problem. The plans may have been carefully executed by capable contractors, under the sympathetic supervision of the landscape architect. With all this preliminary thought and care in design and construction, the result in five years will be only as satisfactory as the character of the maintenance it has received.

This is because, while the materials of the building are relatively fixed, those of which its surroundings are composed are constantly changing and developing. Unless this development and growth is made with sympathetic care and thorough knowledge of its requirements, it will not produce the most satisfactory results.

Maintenance problems may be grouped under the several types of areas found in average school grounds —turf areas, pavements, trees, shrubs, and other plants.

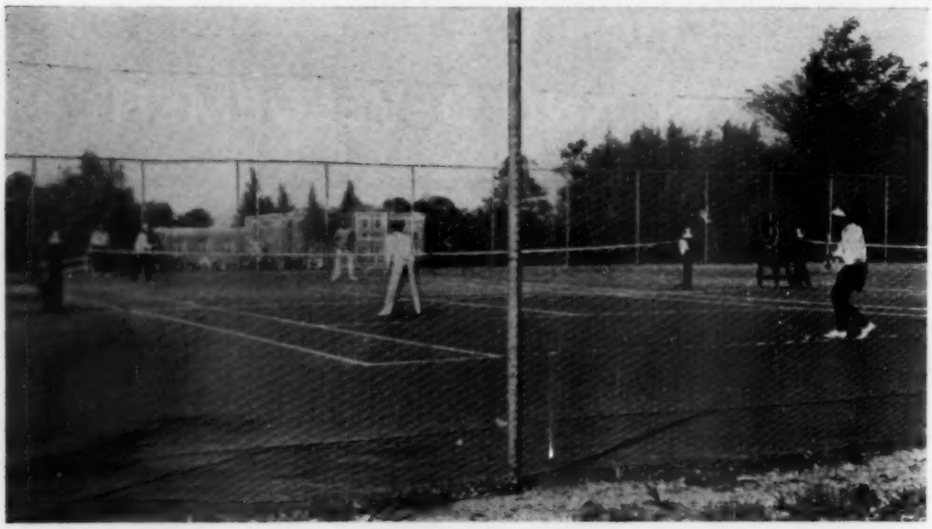
Turf Areas

Turf areas comprise a large percentage of the open spaces in most of the modern school plants, where civic foresight has provided sufficient land for the physical education requirements. These may be divided into two general classes: ornamental lawn areas, designed to dignify the approaches to the buildings, and the spaces immediately adjoining; and sports areas, which are subject to a much more intensive use during the seasons when the school is in session. Because of the divergent character and uses of these two classes of areas, they demand varying types of maintenance to keep them in satisfactory condition for their particular uses.

Lawns and ornamental spaces near the buildings are not ordinarily used intensively, and their care and upkeep is relatively simple. Lawns should be mowed weekly, under normal weather conditions. There is an unfortunate tendency among gardeners to cut the lawns too short. For best appearance the grass should be kept at a height of at least 1½ to 2 inches. This practice produces a lawn of rich texture and provides sufficient foliage for the proper growth of the grass plants, making them more drought-resistant, and discourages weed growth.

It is not the purpose of this article to set forth detailed instructions for lawn maintenance, since the subject is fully covered in numerous publications of agricultural experiment stations and commercial seed growers. Careful and regular mowing, seasonal fertilizing, and sprinkling according to climatic needs, are the fundamentals of good lawn care, and involve no mystery of technique, but merely the intelligent application of well-established practices.

Turf areas used for sports present a somewhat different problem, because it is necessary, during the periods of intensive use, to keep the turf short, tough, and uniform in texture. Separate areas for practice fields and for the several sports are of great advantage, because they permit resting periods for the turf. During playing seasons the grass must be cut shorter than for lawn purposes, perhaps to one inch or even less; but as soon as the area is not required for play, it should be fertilized and allowed to grow longer to provide foliage for its regeneration.



Clay-gravel courts at the Ethel Walker School, Simsbury, Conn.

Football fields, carefully fertilized and maintained during the spring and summer months, will develop enough reserve vitality to carry them through the rigors of the fall playing season with a minimum of injury. Baseball fields, on the contrary, receive their heaviest punishment during the spring term of school. A thorough fertilizing in early spring, and the maintenance of longer grass during the summer and fall, will help to compensate for the injuries caused by intensive use during the playing season.

Turf tennis courts, while considered by some to present the ideal playing surface, are also the most difficult to maintain, and are not ordinarily the most efficient under usual school conditions.

In the aerial photograph of the grounds at the United States Coast Guard Academy at New London, Conn., several types of turf area are well illustrated. The large crescent-shaped lawn at the front of the building is a dual-purpose area. While it serves to enhance the general appearance of the buildings and their approaches, it is also used as a military parade ground during the school year. For the latter purpose it must be kept close-clipped; but as soon as the cadets depart on the annual summer practice cruise, this lawn is thoroughly fertilized and allowed to grow to a height of two inches throughout the summer. Thus it is enabled to withstand intensive use and also to present the appearance of a well-kept lawn as a fitting setting for the fine group of Academy buildings.

At the extreme upper right of this picture is the football field. Because of topographic conditions, it was necessary to construct this field by terracing a steep hillside, so that one side is retained by a high stone wall. This condition imposes a problem of irrigation which is solved by installing a complete overhead sprinkling system during the spring and summer months, and by allowing the grass to grow to at least two inches in height.

Paved Surfaces

Paved areas in the school layout may be of several types, each of which requires particular attention in maintenance. In driveways and parking areas the combination of reasonable cost and low upkeep may be achieved by some type of asphaltic pavement, which is easily maintained with renewal of the stone wearing course at intervals of several years. Gravel and waterbound macadam are cheap to construct but expensive to maintain, while concrete, the most expensive to build and requiring the least maintenance, is of less pleasing appearance for this purpose.

Certain sports areas are more efficient with paved surfaces than with turf. This applies particularly to tennis courts, outdoor gymnasia and apparatus areas. Tennis courts with clay surfaces are very desirable for play, but require considerable maintenance. The variations in surface which have been tried for such courts include gravel, cinders, clay, asphalt compounds, and concrete. The cost and the availability for use increase with each of these types as listed. Nevertheless, many authorities have found their greatest economy and efficiency through the use of some asphaltic type of pavement, which requires little maintenance and also dries rapidly to permit early use after rain. An ideal surface, combining resilience and resistance to wear, is a combination of asphalt and cork.

For track purposes there seems to be nothing more satisfactory than a well-built cinder track. Frequent rolling and the use of calcium chloride will maintain such a surface without undue expense.

Walks and paths are of varying materials according to use. Concrete is the most efficient material under most conditions, since its maintenance cost is negligible. For more ornamental effect, various types of paving stone or brick are used, but these tend to

The baseball field and a portion of the running track, Westminster School, Simsbury, Conn.

Memorial Hall and a corner of the clay tennis courts, Westminster School, Simsbury

increase upkeep costs by reason of stones becoming loose and, in cold climates, by the extra cost of snow and ice removal from their somewhat rougher surfaces.

With properly graded and constructed lawns, sports areas, drives and walks, the heaviest problems of school-ground maintenance become matters of routine. Beyond these factors, however, our attention is directed to the various types of plantations which are found in well-designed school or college grounds.

Trees

Trees are perhaps the most important plants used in school-ground plantings. In the well-planned layout sufficient trees have been specified to relieve bareness, to afford shade on drives, walks and buildings, and to frame vistas. They have been spaced so as not to overshadow play areas, and so as to have sufficient room for their ultimate growth and development. This is in the hands of the maintenance corps.

Trees, when planted on the school campus, are deprived of the natural conditions of the forest or meadow which contribute to their normal growth. Closely cropped lawns, and adjacent driveways or other paved areas, create conditions detrimental to best growth, and make necessary a certain amount of care and watchfulness to assure successful development.

Proper feeding is most important. Everyone is familiar with the modern methods of tree feeding by the use of holes spaced over the feeding area of the roots. Fertilizers of organic sources, with elements properly combined for local conditions, are advisable. Feeding should be done yearly under adverse conditions, and biennially as a routine.

Intelligent irrigation is essential unless normal moisture conditions are favorable. It is also best accomplished by the subterranean method, although the use of an earthen "saucer" is often satisfactory around newly planted trees. Whenever a tree begins to look sick or undernourished, there should be no hesitation about temporarily sacrificing the lawn under it; immediate loosening of the surface soil, fertilizing, watering and mulching should be done and maintained until the tree is restored to full health.

Healthy, well-fed trees will resist disease and insect infestations to a large degree. This, however, does not relieve the maintenance corps from watchful care. Since prevention is better than cure, it is recommended that all trees be given a winter clean-up spray, either of oil or of sulphur type, as an annual routine. Other seasonal sprays are to be used according to the type of insects or disease which may be prevalent in the locality.

Pruning of trees is important, but should not be overdone. In general, the occasional removal of limbs to improve shape, to avoid rubbing against other limbs, or to avoid damage to adjacent structures, is all that is required. Care must be taken to make smooth, close cuts, so that the wound may heal quickly and not leave protruding stubs as seats of future infection and rot. If serious decay or injury occurs in any tree, it should be attended to by qualified tree experts, and not left to the handy man for cure.

Evergreens form an important part of the planting in many school grounds, and are very valuable in their furnishing of color and foliage during the winter months. Feeding, spraying and irrigation are as important as with shade trees. Pruning of evergreens should be reduced to a minimum. Occasional heading back, to preserve density of growth, is advisable, but shearing should never be done except in the care of hedges, or certain especially placed formal specimens. For general pruning of evergreens, always use a pruning knife, and never a shears. There seems to be a universal tendency, when using shears, to "haircut" the plants. More well-designed evergreen plantations have been ruined by men with shears than by any other means, and the resulting collection of "ice cream cones" and "potato patties" is far from the beautiful composition visualized by the designer.

Cultivation of evergreens should be minimized, since they are surface feeders, and disturbance of the soil around them cuts many feeding roots, stunting and weakening the plant. It is better to establish ground cover plants and suitable mulch. Thus by saving maintenance labor a better result will be attained.

Shrubs

Shrubs are used in most plantations to complement the larger plants, and for particular divisional or screening purposes, as well as to provide the variation of bloom, foliage and fruit which add to the attractiveness of the picture. Frequently, in order to create an immediate effect, shrubs are planted too closely to permit their fullest development. Careful thinning of the plants during the first few years of their growth is essential under such circumstances in order to create a satisfactory composition as the plants mature. This can be done by the complete removal of surplus plants, but often the same effect may be obtained by cutting the weaker plants to the ground and allowing the stronger ones to occupy the whole space. One or two seasons of the resultant light starvation will cause the roots to die and become additions to the humus content of the soil.

While shrubs require more cultivation during their first years than other woody plants, that also is often overdone. After a couple of seasons' growth, little disturbance of the soil is necessary, and mulching will be found more economical as well as more productive.

Buildings designed by Supervising Architect, U. S. Treasury Department;
Thomas H. Desmond & Associates, Landarchitects

This air view of the campus of the United States Coast Guard Academy at New London, Conn., and close-ups of the landscaping of two of the buildings, show the importance of fine lawns, trees, and shrubs

Photos by courtesy of the United States Coast Guard

Fine old trees add to the dignity and beauty of the campus of the Ethel Walker School at Simsbury, Conn.

Photos of Ethel Walker School by Harriet E. Henderson
Milton E. Hayman, Architect; Thomas H. Desmond & Associates, Landarchitects

As a rule, shrubs are over-pruned, and pruned at the wrong seasons. Here, again, the shears should be thrown away, to remove the temptation for clipping. As a general rule, prune shrubs immediately after their blossoming period, and do it with a knife by thinning out the older stalks, rather than by cutting back the tops. Thus the natural shape and beauty of the shrubs will be maintained, and the artificial appearance of clipped forms will not ruin the design.

Maintenance Equipment and Personnel

Because the designed landscape is not static, but a growing thing, it is most important that its growth and maintenance should be guided by intelligent advice. It is an increasing custom to retain as a consultant the landscape architect who planned the work, so that by periodic visits he may suggest the proper care of the various elements as the design develops in growth from year to year. By such means, at a moderate cost, the school authority may have the assurance that the grounds will continue to enhance the appearance of the buildings through the years.

The most efficient maintenance of any type of landscape will result from having the proper equipment for the job. Dependent on the size and culture of the area, some of the following tools will be essential. The first purchase is undoubtedly a power mower. It may have a single cutting tool, or a gang, according to the size of the area to be mowed. A type with replaceable rotary and straight cutter bars is adaptable to finished or rough mowing. One or more hand mowers and border mowers will also be required, as well as the usual edging shears and tools to properly trim around trees, walks and driveways.

A light truck is frequently useful, although hand carts may suffice on smaller areas. Spraying equipment, fertilizer spreaders and seeders may be had in combination outfits that pay their way by reducing hand labor. Of course, the completely outfitted toolhouse will include the various types of round and straight shovels, spades, wood and iron rakes, lawn brooms, hoes and cultivators, as well as pruning equipment of all sorts—saws, knives, hooks and clippers.

The most important factor in successful grounds maintenance is the personnel. The man responsible for this work should have a knowledge of horticulture compatible with the responsibility of his job. Too often the care of the grounds is left to a janitor who knows more about sweeping and oiling floors than he does about the care of growing things. If a combination of abilities is necessary because of a limited budget, then employ a good gardener and he can easily learn the routine of inside maintenance, whereas it is much more difficult to make an efficient gardener out of a floor sweeper!

It is fortunate that, throughout the country, many men who are charged with the maintenance of public grounds are bringing to their tasks the ability that comes from a good basic training in their work and the interest to keep abreast of new developments and to seek advice concerning new techniques. Such men can be of great assistance to the landscape architect in carrying on the spirit of his design so that as it matures it may constantly improve, and so that in its ultimate development it may remain as great a source of pride as the day it left his drafting table.

THE COMMUNITY LANDSCAPING PROGRAM OF CABOOL CONSOLIDATED SCHOOLS, TEXAS COUNTY, MISSOURI

By

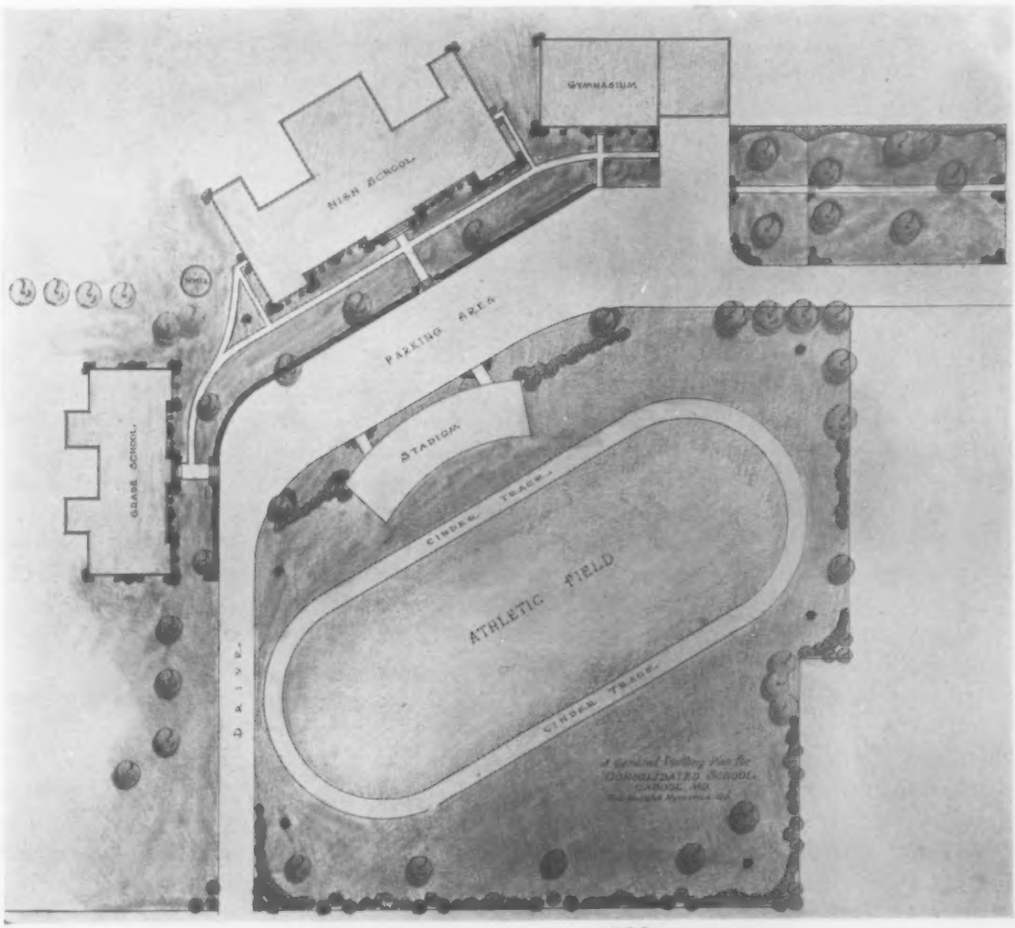
FRANK HEAGERTY and **W. W. HOY**

Superintendent, Cabool Consolidated Schools — **Vocational Agriculture Instructor**

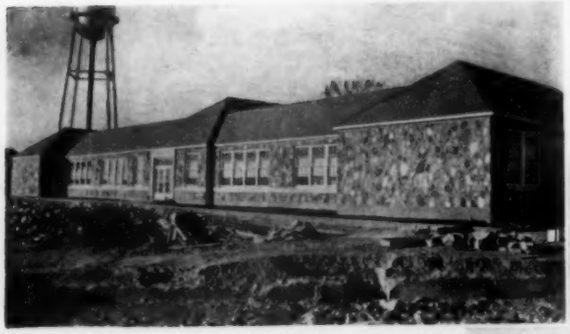
THE county of Texas in Missouri is the largest in the state and is typical of the true Ozark region. There is still talk of the open range, of range cattle and the stock laws. It is for the most part sparsely settled, with much timber, and with neighborhood groups in valleys along streams—Big and Little Piney Rivers, Indian Creek, Panther Creek. Farming is given over almost entirely to the work of dairying, poultry raising, and the production of hay for feed.

A valuable asset in the life of the people of this county is their pride in showing a plant that parents or grandparents brought from Kentucky, Tennessee or Illinois, or pointing to a giant box elder, black walnut, pine, chestnut or elm that the father of the family started. We challenged a man connected with agriculture in the Ozarks to make a tour through the most backward section of the entire region and find one cabin, one place that someone called home, and not discover some evidence of a desire to improve the appearance of the surroundings. After the tour, he admitted that he had been unable to find one home where no one had planted vines, a rosebush, iris, firebush, cedar or pine, displayed potted plants, painted the dwelling, hung window curtains, screened an eyesore, or beautified in some other way.

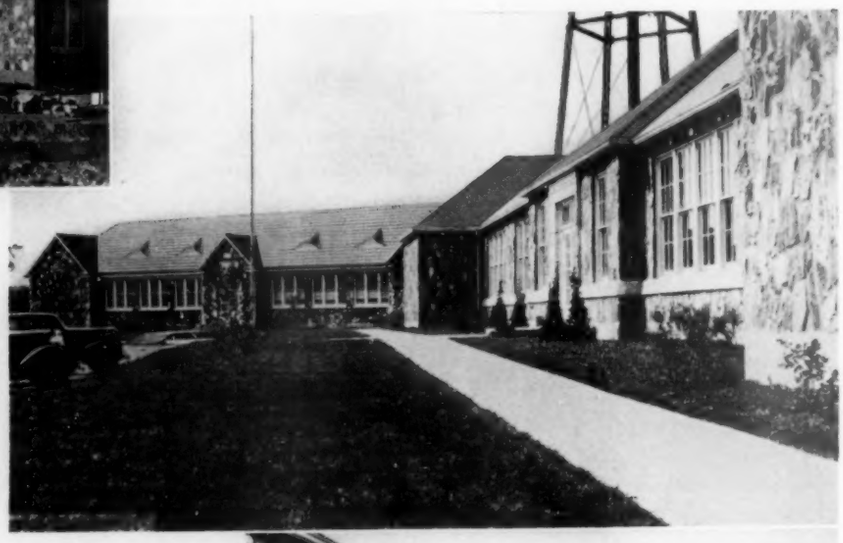
We felt that with this innate desire, and the general need so painfully obvious, time would be well spent



The general planting plan developed for the Cabool Consolidated Schools. Ten trees and more than one hundred shrubs have been planted on the first unit to be landscaped



Left—The high-school building before landscaping



Right and below—Towards midsummer, as the young planting begins to show

in making the satisfaction of the desire easier financially, and more interesting by helping to introduce new plants and better schemes of planting.

As the Plan Developed

The Cabool Consolidated Schools therefore undertook a community landscaping program based on the theory that, in order to keep boys and girls on the farm, their homes must be made as attractive as corresponding homes in the towns and villages. The farm boy or girl must not be ashamed to say to a friend, "This is my home," or, "Won't you spend the week-end with us?"

Tentative objectives having been drawn up, the cooperation of the Cabool Parent Teachers Association and the Cabool Chamber of Commerce was solicited. Both of these organizations heartily endorsed the objectives and selected three women and six men to serve on the Community Home Beautification Committee. Several meetings of the committee were held to discuss methods of publicity and procedure. Eventually, it was agreed to invite reputable nurseries, equipped to supply landscaping plans as well as plants, to submit prices based upon volume of purchase. The committee selected the Neosho Nursery Co., Neosho, Mo., after due consideration of all responsibilities involved.

J. A. Hanebrink, editor of *The Cabool Enterprise*, contributed the full support of his newspaper to publicizing the program. Vocational agriculture classes, home economics classes, civics classes and grammar school classes aroused interest and advertised the program by undertaking the study of landscaping in the classrooms. Committeemen brought the program up for discussion at numerous adult meetings in both town and country.

Varieties of trees and shrubs were recommended which are adapted to our soil and climate and with which local people are more or less familiar. Common names of shrubs were used during solicitation. In all publicity and discussion people were urged to use as much as possible of our best native wild shrubs and trees, which are abundant.

Along with the tree and shrub program, the committee urged the remodeling of buildings; the removal of dilapidated back-yard buildings; the liberal use of paint or stucco; removal of rubbish and weeds; reseeding; sodding or fertilizing of lawns; planting of back-yard flower gardens and rock gardens. Many good stands of lawn grass had been ruined by eight consecutive drought years.

By February, 1939, plans began to show results. Orders for shrubs were accumulating and the first shipment from Neosho Nurseries came in. Much interest was aroused at the school grounds when a shipment arrived for the school. School children eagerly assisted teachers in locating each plant according to blueprint, and transplanting directions were followed religiously. After the plants were in place at the school, teachers took their pupils on a tour of the grounds to study the varieties and the landscaping scheme. This served to interest the pupils and also aroused the interest of their parents, since the pupils carried the information back to 400 or more homes.

More than one hundred shrubs, ten trees, and twenty evergreens were planted on the first unit of the Cabool school grounds. Plans are to complete the landscaping of the school grounds in a period of three years.

Wide Results of the Program

School teachers and other civic leaders in various nearby communities have since taken up the plan; notable progress has been made in Houston, Summerville, Licking, and Mountain Grove as well.

The total number of business locations, schools, farm and town residences planned and landscaped last spring as a direct and indirect result of the activities of the Community Home Beautification Committee will never be accurately enumerated. However, present known evidence shows that no less than 278 families, schools, and business organizations cooperated and planted 496 trees and 4,000 shrubs, remodeled or improved 100 buildings, and tore down 50 worthless buildings. In addition, 500 places cleaned up all rubbish; 78 lawns were improved by sodding, re-seeding, or fertilizing; 208 families planted flowers for ornamental purposes.

Plans are already being made to expand the program in 1940. We expect to further coordinate efforts of the various communities in the area. Cooperation of the State Highway Department has been solicited and pledged by our 9th Division Engineer, N. N. Ropes, of Willow Springs.

A central shrub, seed, and bulb exchange bureau will be established, where citizens may "bring one" and "take one." Another plan is to have some of our school organizations undertake projects in propagation of plant cuttings for distribution at low cost to families otherwise unable to participate in the program.

We now have one of the most progressive communities in America, and our people are preparing to enjoy it.

Before
This bare yard is typical of many in Cabool County before the community landscaping plan went into effect

After
Hundreds of such transformations have already been made, and plans are going into effect to expand the program in 1940

LANDSCAPE ARCHITECTS FOR UNIVERSITY AND SCHOOL PROJECTS

The following directory is restricted to Landscape Architects who are in independent professional practice and have actually been identified with a number of university or school projects.

Space limitations permit only three listings for each individual or firm, and preclude mentioning either the name of the architect associated or the definite character of the work undertaken for each institution. It is believed that the majority of landscape architects specializing in school and university work are here represented, and that many of the projects listed have had a considerable influence on high-grade professional practice in the planning and planting of school grounds and college campuses throughout the United States.

CALIFORNIA

Charles G. Adams, 440 Arroyo Drive., South Pasadena
Pasadena Junior College, Pasadena
Pasadena Public Schools, Pasadena
University of California Arabian Horse Ranch, Pomona

Ralph D. Cornell, 3723 Wilshire Blvd., Los Angeles
Pomona College, Claremont
University of California at Los Angeles
University of Hawaii, Honolulu

Frederick N. Evans, 1341 40th St., Sacramento
Sacramento Junior College, Sacramento
Fall River Union High School, McArthur
Modoc Union High School, Alturas

John William Gregg, University of California, Berkeley
Campus development for the University of California at Berkeley, Los Angeles, Riverside, Davis, La Jolla and U. C. Hospital, San Francisco
Mills College, Oakland.

Harry Whitcomb Shepherd, 821 Shattuck Ave., Berkeley
Union High School and Junior College, Marysville
Branch College of Agriculture, Davis
Round Valley Union High School, Covelo

Butler S. Sturtevant, 210 Post St., San Francisco
University of Washington, Seattle
Principia College, Elsah, Ill.
Principia School, St. Louis, Mo.

Paul G. Thiene, Pasadena
Alhambra High School, Alhambra
Santa Maria Union High School, Santa Maria
Excelsior Union High School, Norwalk

COLORADO

S. R. DeBoer, 515 E. Iliff Ave., Denver
Regis College, Denver
Boulder High School, Boulder
Mt. St. Gertrude Academy, Boulder

CONNECTICUT

Thomas H. Desmond & Associates, Inc., Simsbury
U. S. Coast Guard Academy, New London
University of Connecticut, Storrs
Simsbury High School, Simsbury

Joseph F. Whitney, Middlesex Rd., Darien
Engineering Court, University of Cincinnati, Ohio
School Group, Falmouth, Mass.
Grade and High School, South Dennis, Mass.

FLORIDA

Herbert L. Flint, Post Office Bldg., Winter Park
Mount Union College, Alliance, Ohio
Newport School, Ironwood, Mich.
Rollins College, Winter Park

ILLINOIS

Robert Bruce Harris, 750 North Michigan Ave., Chicago
Marshfield Senior High School, Marshfield, Wis.
School District No. 69, Niles Center
Westview High School, Westview, Pittsburgh, Pa.

Chance S. Hill, 1333 Maple Ave., Downers Grove
Western Illinois State Teachers College, Macomb
North Central College, Naperville
Northern Illinois State Teachers College, DeKalb

Simonds, West & Blair, 1101 Buena Ave., Chicago
Monticello College, Godfrey
Chicago Latin School, Chicago
Country Day School, Winnetka

F. A. Cushing Smith & Associates, 333 North Michigan Ave., Chicago
St. Agnes School, Albany, N. Y.
Rockford College, Rockford
Medical and Dental College, University of Illinois, Chicago

INDIANA

Lawrence V. Sheridan, Brendonwood, Indianapolis
Purdue University, Lafayette
St. Mary of the Woods Academy, Terre Haute
Shortridge High School, Indianapolis

IOWA

P. H. Elwood, 711 Ash Ave., Ames
St. Amelian's School, Milwaukee, Wis.
Iowa State College, Ames
Iowa State University, Iowa City

LOUISIANA

William S. Wiedorn, 2716 Coliseum St., New Orleans
Tulane University, New Orleans
Dillard University, New Orleans
Terrebonne Parish High School and Athletic Field, Houma

MAINE

Beatrix Farrand, Reef Point, Bar Harbor
Yale University, New Haven, Conn.
Princeton University, Princeton, N. J.
Oberlin College, Oberlin, O.

MARYLAND

Joseph C. Gardner, 7110 Clarenden Rd., Bethesda
Woodrow Wilson High School, Washington, D. C.
Eckington School and Recreation Center, Washington, D. C.
Bethesda-Chevy Chase High School, Bethesda

Irving W. Payne, 4017 Leland St., Chevy Chase
Georgetown Preparatory School, Garrett Park
The Miss Madeira School for Girls, Greenway, Va.
Lanham Grade School, Lanham

MASSACHUSETTS

Robert Washburn Beal, 185 Devonshire St., Boston
Eldon Keith Field, High School, Brockton
Bowdoin College, Bowdoin Athletic Field, Brunswick, Maine
Wellesley High School & Hunnewell Playground, Wellesley

Franklin Brett, Franklin St., Duxbury
Marshfield High School, Marshfield
Weston High School, Weston
Duxbury High School, Duxbury

Herbert J. Kellaway, 12 West St., Boston
Andover Newton Theological School, Newton Center
Middlebury College, Middlebury, Vt.
Oak Hill School, Newton

Warren H. Manning Associates, 1430 Massachusetts Ave., Cambridge
Randolph Macon College, Lynchburg, Va.
Cornell University, Ithaca, N. Y.
Phineas Lawrence School, Waltham, Mass.

Hallam L. Movius, 115 Newbury St., Boston
Bradford Junior College, Bradford
Bowdoin College, Brunswick, Me.
Tilton Academy, Tilton, N. H.

John Nolen, Harvard Square, Cambridge
Babson Institute, Wellesley
Queens College, Charlotte, N. C.
University of Wisconsin, Madison, Wis.

Olmsted Brothers, 99 Warren St., Brookline
Phillips Academy, Andover
Grove City College, Grove City, Pa.
Duke University, Durham, N. C.

Bremer W. Pond, 5 Boylston St., Cambridge
Colby Junior College, New London, N. H.
University of New Hampshire, Durham, N. H.
Southern Methodist University, Dallas, Texas

William H. Punchard, 30 Brookfield Rd., Waltham
Woburn High School Athletic Field, Woburn
Middlebury College, Middlebury, Vt.
Abbot Academy, Andover

Arthur A. Shurcliff, 11 Beacon St., Boston
St. Paul's School, Concord, N. H.
Amherst College, Amherst
Mount Holyoke College, So. Hadley

MICHIGAN

T. Glenn Phillips, Charlevoix Bldg., Detroit
Michigan State College, East Lansing
Starr Commonwealth for Boys, Albion
Michigan College of Mining and Technology, Houghton

H. O. Whittemore, 1920 Norway Rd., Ann Arbor
Nichols Arboretum, University of Michigan, Ann Arbor
Ann Arbor Public Schools
Hartland Consolidated School, Hartland

Raymond Hill Wilcox, Union Guardian Bldg., Detroit
Duns Scotus College, Detroit
Starr Commonwealth for Boys, Albion
Plymouth Public Schools, Plymouth

MINNESOTA

Hugh Vincent Feehan, 1004 Marquette Ave., Minneapolis
St. Thomas College, St. Paul
Robbinsdale High School, Robbinsdale
College of St. Scholastica, Duluth

Morell & Nichols, Inc., 1200 Second Ave., South, Minneapolis
University of Minnesota, Minneapolis
Washington State College, Pullman
Carleton College, Northfield

MISSOURI

Hare & Hare, 114 W. 10th St., Kansas City
University of Texas, Austin
Wyandotte High School, Kansas City, Kans.
63 Schools, Fort Worth, Texas

John Noyes, Railway Exchange Bldg., St. Louis
Southeastern Teachers College, Cape Girardeau
Ladue School, Ladue
Webster Groves Schools, Webster Groves

NEW JERSEY

Brinley & Holbrook, Morristown
Trenton State Teachers College, Hillwood
Montclair Teachers College, Montclair
Jersey City Normal School, Jersey City

Michael M. Burris, 485 Engle St., Englewood
Bergen Junior College, Teaneck
High School and 4 Grade Schools, Teaneck
Grade School, Basking Ridge

NEW YORK

Sheffield A. Arnold, Inc., 101 Park Ave., New York
Central Junior-Senior High School, East Park
Central School, Goshen
Roscoe School, Roscoe

A. F. Brinckerhoff, 101 Park Ave., New York
Connecticut College for Women, New London
Millbrook School for Boys, Millbrook
State Training School for Feeble Minded, Southbury, Conn.

Harold A. Caparn, 144 E. 30th St., New York
Manhasset L. I. District No. 6, Manhasset
Lebanon Valley College, Anville, Pa.
Brooklyn College, Brooklyn

Laurie D. Cox, 136 Kensington Place, Syracuse
Dundee Central School, Dundee
Chancellor Livingstone School, Hudson
Union Free School, Dist. 7, Hartsdale

Alling S. DeForest, 16 Fair Place, Rochester
High School and North Street School, Geneva
Villa de Chantal, Rock Island, Ill.
Colgate-Rochester Divinity School, Rochester

Bryant Fleming, Wyoming
Cornell University, Ithaca
Toronto University, Toronto, Canada
District School, Wyoming

Alfred Geiffert, Jr., 101 Park Ave., New York
University of Illinois, Urbana
Hunter College, New York
New Jersey College for Women, New Brunswick

Francis Hastings Gott Associates, 920 Merchants Rd., Rochester
Pittsford High School, Pittsford
Ovid Central School, Ovid
East Bloomfield School, East Bloomfield

William E. Harries, 110 Franklin St., Buffalo
Belknap School, Lockport
Hawley Area School, Lockport
Brocton Central School, Brocton

Roeder J. Kinkel Associates, 438 Delaware Ave., Buffalo
Evangelical Training School, Dunkirk
Batavia High School, Batavia
Masten Park School, Buffalo

Charles Downing Lay, 101 Park Ave., New York.
Free Academy, Newburgh
Lenox School, Lenox, Mass.
New York State Normal Training School, Cortland

H. B. Littlefield, "Little Field," North White Plains
Central High School, Hancock
High School and Stadium, White Plains
Battle Hill School, White Plains

William Pitkin, Jr., and Seward H. Mott, Inc., 82 St. Paul St., Rochester
Kalamazoo College, Kalamazoo, Mich.
Kent State University, Kent, Ohio

Richard Schermerhorn, Jr., 342 Madison Ave., New York
St. Anthony's Seminary, Catskill
Albany Academy, Albany
Rensselaer Polytechnic Institute, Troy

Jacob John Spoon, 128 Greenacres Ave., White Plains
Academy of St. Joseph-in-the-Pines, Brentwood
Penn. Township School Dist. High School Grounds, Bernville, Pa.
Central School District No. 1, Pine Plains

A. Carl Stelling, 101 Park Ave., New York
Athletic and Recreation Grounds, Bronxville
Mahopac Central School Grounds, Mahopac
Tannersville High School Grounds, Tannersville

Thomas Lyon White and Leonard G. Wheeler, 445 S. Warren St., Syracuse
Cato-Meridian School, Cato
Delaware Academy and Central School, Delhi
Troy High School, Troy

NORTH CAROLINA

E. S. Draper Associates, 2038 Beverley Dr., Charlotte
Winthrop College, State College for Women, Rock Hill, S. C.
Lanier Memorial School, Langdale, Ala.
Agnes Scott College, Decatur, Ga.

OHIO

Alexander & Strong, 4500 Euclid Ave., Cleveland
Kent State University, Kent
University School, Cleveland
Mentor Village School, Mentor

A. D. Taylor, 4614 Prospect Ave., Cleveland
Oregon State University, Corvallis
Carnegie Institute of Technology, Pittsburgh, Pa.
Notre Dame College, Cleveland

PENNSYLVANIA

Wheelwright & Stevenson, 225 S. 15th St., Philadelphia
The Gunnery School, Washington, Conn.
St. Andrews School, Middletown, Del.
Muhlenberg College, Allentown

VIRGINIA

Albert A. Farnham, 1240 White Oak Rd., Roanoke
Virginia Polytechnic Institute, Blacksburg
Floyd County High School, Floyd County
Warren County High School, Front Royal

Charles F. Gillette, 105 E. Cary St. Richmond
Virginia State College for Negroes, Petersburg
Bennett College, Greensboro, N. C.
St. Catherine's School, Richmond

WISCONSIN

Phelps Wyman, 759 N. Milwaukee St., Milwaukee
State Teachers College, Milwaukee
Central and West Grade Schools, Rhinelander
High School, Ashland

CANADA

Arthur M. Kruse, 707 Eglinton Ave., West, Toronto, Ontario
The Boys' Training School, Bowmanville, Ontario
Woodstock College, Woodstock, Ontario
Belleville Institution for the Deaf, Belleville, Ontario

THE COLE NURSERY COMPANY

Introducers of Truehedge Columnberry

ESTABLISHED 1881 — Plant Patent No. 110 — 600 ACRES

Painesville, Ohio

Truehedge Columnberry is being used in huge quantities at the World's Fair in New York, — one individual order consisting of more than 10,000 plants

BEAUTIFY YOUR SCHOOL GROUNDS WITH TRUEHEDGE COLUMNBERRY

HERE, at last, is a hedge as beautiful as boxwood, which it closely resembles, and as hardy as the common Japanese barberry. First introduced in July, 1934, it has been much sought after by school and college executives, as well as park superintendents, landscape architects and others interested in beautifying public grounds or private estates.

Truehedge Columnberry is as beautiful as boxwood, considerably lower in price, and infinitely more hardy. It is particularly welcomed in the north because it withstands severe weather conditions so admirably. It rapidly attains mature size, forming a dense hedge of glossy, deep green foliage. It may be quickly trimmed to make a formal hedge, or left untrimmed to make an unsurpassed semi-formal hedge. The density of this plant, as compared with common barberry, is almost unbelievable.

These actual photographs picture the unsurpassed beauty of Truehedge as developed by Mother Nature, untainted and unchanged by human hands. Individual trimmed and untrimmed specimens for accent and other spectacular purposes are easily attained. Individual columns, boxes, ovals, fans, and artistic topiary designs may be quickly created.

New **Truehedge Columnberry** **Common Barberry**

Our free illustrated booklet describes in words and pictures the varied uses of Truehedge and also tells of the gratifying results obtained by many of the best Parks and Cemeteries of our country.

THE COLE NURSERY COMPANY grows a complete line of

"Everything That's Good and Hardy"

Shrubs, Shade and Ornamental Trees, Roses, Vines, Fruits and Perennials

Wholesale Catalogue on Request.
Inquiries appreciated.

DISTRIBUTORS

Plants are available at any of the following nurseries, or may be ordered direct from the Cole Nursery Company:

Adams Nursery, Inc., Springfield, Mass.
Bay State Nurseries, North Abington, Mass.
Fairview Evergreen Nurseries, Fairview, Pa.
Charles Fiore Nurseries, Prairie View, Ill.
Jackson & Perkins Co., Newark, N. Y.
Lester C. Lovett, Little Silver, N. J.
Henry A. Dreer, Inc., Philadelphia, Pa.
I. E. Ilgenfritz' Sons Co., Monroe, Mich.
R. M. Kellogg Company, Three Rivers, Mich.
Mount Arbor Nurseries, Shenandoah, Iowa
Shenandoah Nurseries, Shenandoah, Iowa
E. D. Smith & Sons, Ltd., Winona, Ontario
Storrs & Harrison Co., Painesville, Ohio
Vaughan's Seed Store, Western Springs, Ill.
Wayside Gardens Co., Mentor, Ohio

LARGE ILLUSTRATED BOOKLET DEPICTING TRUEHEDGE COLUMNBERRY SENT FREE ON REQUEST

Picture of TRUEHEDGE COLUMNBERRY taken immediately after first trimming, which consumed about thirty minutes per row with hedge shears; plants three years old; June, 1935

GRAVELY MANUFACTURING COMPANY

Box 801, Dunbar, W. Va.

Schools throughout the country recognize the distinct advantage of the GRAVELY . . . ONE Machine that ALONE solves so many upkeep problems.

You buy ONE sturdy 5 H. P. Tractor . . . Then, change Power Attachments according to the job. With the GRAVELY One Man Does EVERYTHING . . .

A 30" Power Driven Rotary Mower for the Lawns. (Power Driven Gang Units and Riding Sulky available for the larger areas.)

A 42" Power Sickle Mower for the Rough Spots or Athletic Fields.

A Power Sprayer . . . A Power Pump . . . Small Cart for odd Jobs of Hauling . . . And, both a V and a Patented Reversible Blade Type Plow for Snow Removal.

Learn more about a machine that for 18 years has been improving the appearances of Schools while at the same time reducing upkeep cost.

Exclusive GRAVELY Features:

5 H. P. Motor . . . 2 Forward Speeds and Reverse . . . No Chains, direct Gear Drive . . . One Spot to Lubricate both Motor and Transmission . . . Automotive type Differential.

"WHEN IT RAINS, IT POURS"

But, When It Snows . . .

You want to be prepared to clear it from the sidewalks. Do this quick and you will be praised.

Be slow, and it's just the opposite.

The modern GRAVELY Tractor with the Snow Plow is a "natural" for that kind of work.

YOU CAN DO IT *ALL* WITH A **GRAVELY** TRACTOR-MOWER

Ask for Catalog entitled:

"MY IDEA OF A PRACTICAL POWER MOWER"

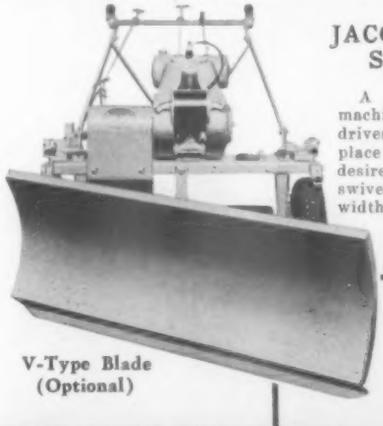
JACOBSEN MANUFACTURING CO.

Factory and General Offices: Racine, Wisconsin

DISTRIBUTORS IN ALL PRINCIPAL CITIES

POWER MOWERS FOR LAWNS OF EVERY SIZE

Among schools and universities no power mower can show a more brilliant record for adaptability, mowing efficiency, and economy than the Jacobsen "4-Acre." Has dependable, powerful engine, all-gear drive, auto-type differential and dual clutch control. Available with single or double power-driven side units . . . or sickle bar attachment and riding sulky, it has a capacity range of 4 to 10 acres a day and meets all mowing requirements for lawns of every size.



V-Type Blade
(Optional)

JACOBSEN Sidewalk SNOW PLOW

A powerful, easy-handling machine for clearing sidewalks, drives, ice-skating rinks — any place where quick clean-up is desired. Has 54-inch 2-way swivel blade, 47-inch plowing width. Large ballast platform for positive traction.

AVAILABLE with INTERCHANGEABLE SICKLE BAR ATTACHMENT For *Year 'Round Economy*

Jacobsen Mowers have won a world-wide reputation for matchless mowing efficiency, dependability, and low operating cost—the reward of 19 years of specialized power mower engineering. There are wheel and roller type models for every size lawn—ranging from $87.50 up.

JACOBSEN Standard Estate

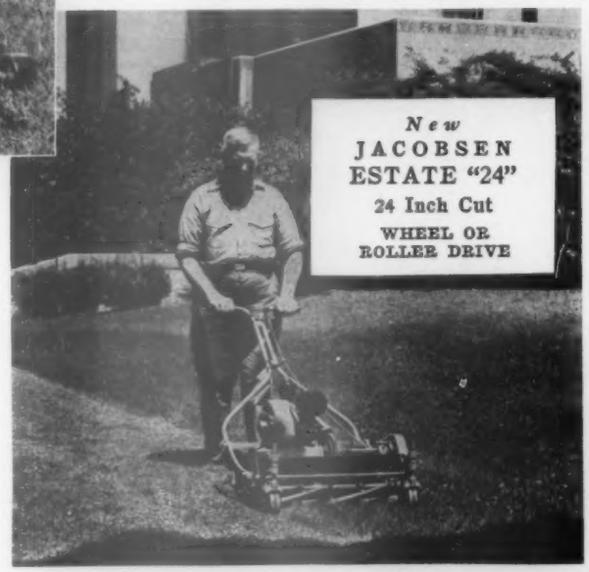
(Not shown)

A heavy-duty roller type power mower in 24 and 30 inch cut with a capacity of 4 to 6½ acres a day. All gear drive. Combines big capacity mowing and light rolling into one easy operation. Recommended for large, exceptionally fine school lawns.

JACOBSEN Lawn King

(Not shown)

A light, powerful wheel type mower for moderate size school lawns. Has 24 inch cut—capacity 4 acres a day. Moderately priced yet built for hard, continuous service.



Recommended for average size lawns, the new Estate "24" may be had with two rubber tread traction wheels for ordinary mowing . . . or with interchangeable roller drive for finer grades of turf. Elimination of side wheels makes it a close-trimming machine—works over edges of walks, flower beds, close to obstructions. Capacity 4 acres a day. A powerful, precision-built mower designed for long service life.

Jacobsen

PIONEER BUILDERS OF POWER MOWERS

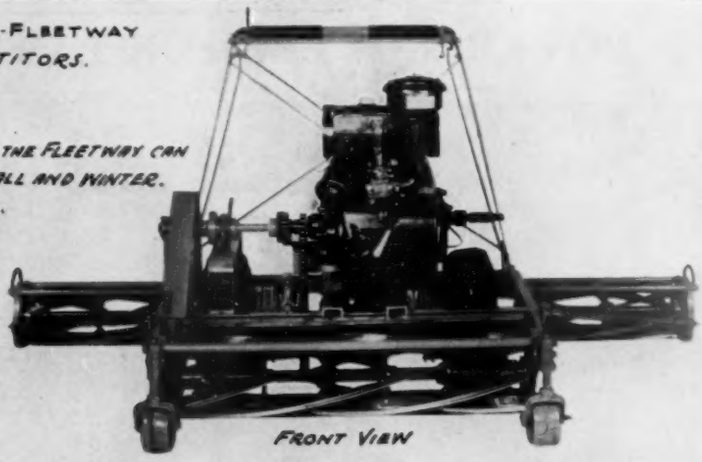
THE MOTO-MOWER COMPANY

Main Office: 4600 Woodward Avenue, Detroit, Michigan

THESE FEATURES ARE WHAT PUT MOTO-MOWER-FLEETWAY IN A CLASS BY ITSELF – IT HAS NO COMPETITORS.

WITH THESE ATTACHMENTS THE FLEETWAY CAN BE USED SPRING, SUMMER, FALL AND WINTER.

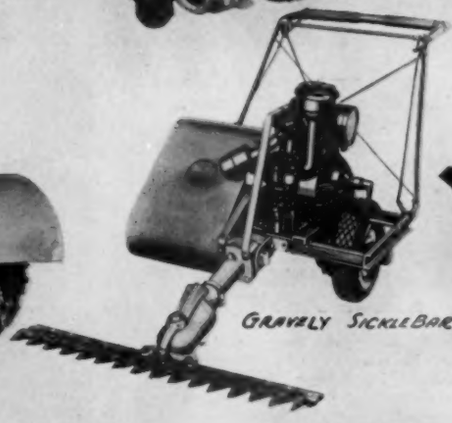
TRAILERS RAISED



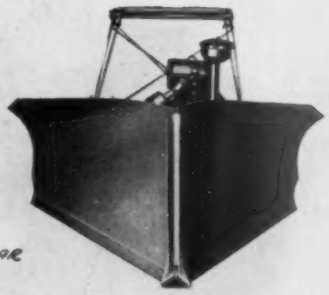
FRONT VIEW

WITH LAWN SWEEPER

FORWARD ROTARY SWEEPER



GRAVELY SICKLE BAR



SNOW PLOW

SPRINGFIELD LAWN SWEEPERS

3 MODELS

28" HAND OPERATED

36" TRAILER TYPE

36" POWER TYPE

FOR BETTER PARKS, GOLF COURSES, CEMETERIES, INSTITUTIONS OR OTHER PLACES WHERE THE BEAUTY OF GRASS IS DESIRABLE.

JUST ANOTHER REASON WHY YOU SHOULD BUY MOTO-MOWER PRODUCTS

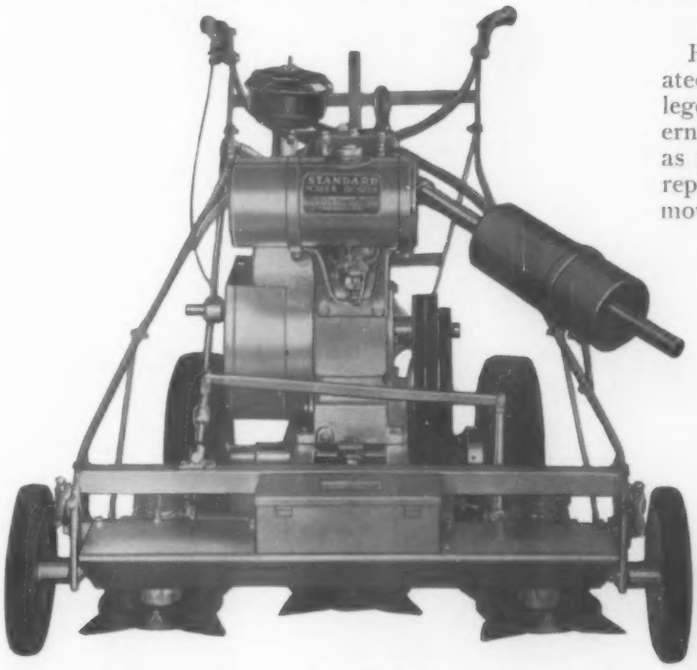
Moto Mower Co.
DETROIT MICHIGAN

STANDARD MFG. & SALES CORPORATION

Lebanon, Indiana

STANDARD POWER MOWERS

Solve Every Mowing Problem ***A Mower and Attachment for Every Purpose***



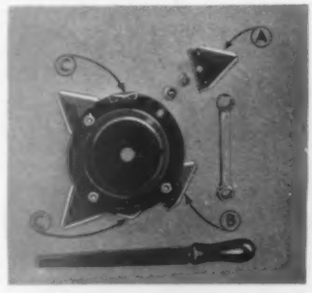
Model	Width of Cut	H.P.	No. Cutters	Capacity
Model A-9	25″	2	2	5- 6 acres
Model AA-9	30″	2	2	6- 7 acres
Model B-9	37″	3	3	7- 8 acres
Model BB-9	48″	4	4	9-10 acres
Model C-9	62″	4	4	10-12 acres

THE STANDARD ROTARY CUTTER

Has been on the market for seven years, and operated under the hardest kind of service. Used by colleges, parks, schools, large estates, cemeteries, Government facilities, etc. Some individual users have as many as 14 of these mowers in use and are still replacing other mowing equipment with Standard mowers. Standard Power mower has been developed into the most versatile cutting device in the field—cutting lawn-grass, dandelion, buck-horn, Johnson grass or any other standing growth without cumbersome attachments. It will cut evenly at any height; permits high mowing.

Cutter Blades are Standard Mower Sections

Rotary Cutter Disc Unmounted



A. **Standard Mower Cutting Blade, bolt and friction lock.** ***B.*** **Illustrates how blade turns under disc if obstruction is encountered.** ***C.*** **Two vertical cutters on each disc cut long growth into short lengths.**

Standard mowers are equipped with double tube rear tires—solid front. Briggs & Stratton motor—Goodyear tires.

Large schools, colleges, parks and estates use STANDARD Power Mowers

Standard mower with snow plow attachment used on Models A-AA- and B-

Mower with Leaf Pulverizer Attachment

Two large mowers mowing in large Park

Leaf Pulverizer attachment is a long desired solution for your leaf problems. Gathers, pulverizes, disperses leaves as a fertilizer for your lawns.

WRITE FOR FULL DESCRIPTION OF ALL STANDARD EQUIPMENT AND DEMONSTRATION BY LOCAL DEALER

WHIRLWIND LAWN MOWER CORPORATION

WHIRLWIND **Manufacturers of Whirlwind Power Lawn Mowers** WHIRLWIND

730 W. Virginia Street, Milwaukee, Wisconsin

A COMPLETE MOWING JOB IN ONE OPERATION

The economies effected by being able to perfectly cut and to completely trim a lawn in one operation and with **one** machine have made the Whirlwind Power Lawn Mower particularly adaptable to school lawns where flower beds, hedges, shrubbery, and trees make mowing increasingly expensive. Whirlwind's ability to trim directly up to any obstacle means that time ordinarily wasted in clipping with sickle or shears is eliminated. The cutter blade is adjustable by spacers so that grass can be cut from grass roots to a height of 3½ inches. Too, the Whirlwind efficiently cuts short, fine grass or tallest weeds without aid of special attachments. All clippings are completely pulverized and they settle back into the root-bed as fertilizer.

ECONOMY OF MAINTENANCE

The simplicity of Whirlwind's mechanism largely nullifies the cost of maintenance. Elimination of reel and bottom blade makes sharpening a minute's job of easy hand filing by the operator. The application of power to propel the Whirlwind has been accomplished in a simple, direct way that eliminates trouble-creating mechanism.

A MODEL FOR ANY SCHOOL'S REQUIREMENTS

There is a Whirlwind Power Lawn Mower to fit the need of every school lawn. Both power driven and hand pushed models are available. Whirlwinds are equipped with Briggs & Stratton motors, industrial pneumatic tires, and alemite grease fittings.

MECHANICALLY SOUND

The Whirlwind Power Lawn Mower's cutter knife is propeller-like in action, revolving horizontally on an axis. Each end of this blade, revolving at tremendous speed, carries a 3½ inch cutter knife placed at such an angle that all cutting is done by scythe-action. On the back of each of these knives is an uptilted "lifting" blade. As the cutters revolve these uptilted "tails" create a suction that gives surrounding air a "lift."

This suction pulls all short, flat-lying, stray grasses into the path of the flying blades—"holds" them for cutting. It is this scythe-suction combination, an exclusive Whirlwind feature which makes it possible to trim directly up to any obstacle.

WRITE FOR DETAILED INFORMATION

A new folder, containing a full description of all Whirlwind models, will be of great interest to you. Write the Whirlwind Lawn Mower Corp., Milwaukee, Wisconsin.

ASK FOR A DEMONSTRATION

WHIRLWIND LAWN MOWER CORP.

730 W. VIRGINIA ST.

MILWAUKEE **WISCONSIN**

COLDWELL LAWN MOWER COMPANY

Manufacturers of

Hand, Horse and Motor Lawn Mowers

Newburgh, N. Y.

SINCE 1867

COLDWELL POWER MOWERS AND HAND MOWERS
MODELS FOR EVERY TYPE LAWN AND EVERY PURPOSE

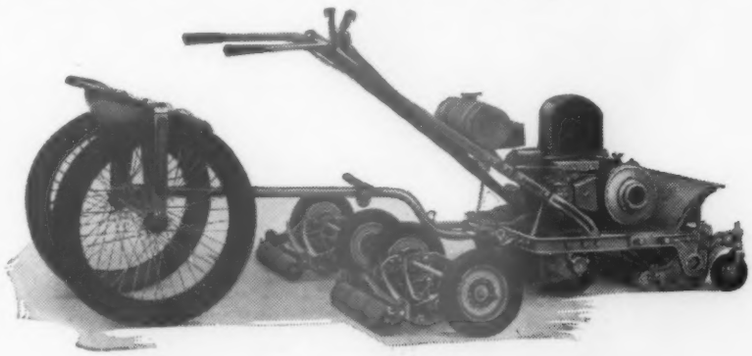
For over 70 years—ever since 1867—the Coldwell Lawn Mower Company has pioneered in the development and manufacture of superior lawn mowers. Superior not only in their long service life and low operating cost, but also in their superior efficiency in the maintenance of beautiful lawns. Educational directors, Superintendents of Schools and Universities and others in charge of large lawn areas find the Coldwell line of mowers covers every possible mowing requirement.

Whether for large-scale mowing or for trimming neatly close up to walls, walks or hedges, there is a Coldwell Lawn Mower that exactly fits each need—and the operating performance of each of the many models available leaves nothing to be desired. Mowing, rolling and trimming are accomplished at a minimum of time and expense—and their simplicity of design and ease of operation enable anyone to operate them. From every standpoint. . . .

"Coldwell Lawn Mowers Give You More Mower for Your Money"

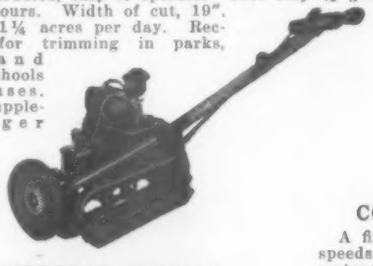
"SUPER TWIN" and "HEAVY DUTY" MOWERS

For large-scale work, one of the Coldwell Super Twin Mowers with water-cooled motors—or Heavy Duty Mowers with air-cooled Briggs & Stratton motors—and Heavy Duty Gang Units, is the ideal equipment. At the right is shown the Super L Twin Rubber Roller Model with Riding Sulky and pneumatic-tired gang units, 60" cut. The Super Models and the Heavy Duty Models have an abundance of power—plenty of it for grades and when the operator rides the Sulky. Large widths of cut are made by adding extra cutting units. As a single unit it can be used for trimming along driveways and walks, around trees and flower-beds. The Heavy Duty Gang Mower cutting units contain steel gears contained in a dirt-proof housing, the wheels run on roller bearings. These units are available with heavy metal wheels or pneumatic-tired wheels, and are equipped with sectional guard rollers. Other models are SUPER L TWIN and HEAVY DUTY TWENTY-FIVE with four gangs cutting 94", SUPER TWIN THIRTY and HEAVY DUTY THIRTY with two gangs cutting 65", SUPER TWIN THIRTY and HEAVY DUTY THIRTY with four gangs cutting 100".



COLDWELL BADGER

An amazing new small power mower built to meet the demand for an extremely low-priced machine for use on lawns of from ¼ to 4 acres. Mows, rolls and trims. Simply constructed, easy to operate. Uses only ¾ gal. fuel per 8 hours. Width of cut, 19". Cuts ½ to 1¼ acres per day. Recommended for trimming in parks, cemeteries and around schools and campuses. Ideally supplements larger equipment.

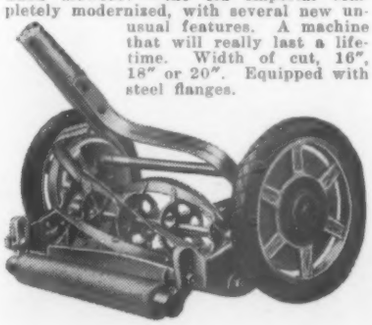


COLDWELL BEAVER

A stream-lined, all-around utility power roller mower priced low, for use on smaller estates. Mows, rolls and trims to perfection at low operating expense. Width of cut, 21". Briggs & Stratton motor. 6" diam., 5-bladed revolving cutter with cold rolled steel center shaft mounted on Precision Ball Bearings. Expressly built to fill the need for a low-cost power roller mower of high efficiency. Note:—Other models with Briggs & Stratton motors are Standard Twenty-Five and Standard Thirty, Regular, Deluxe and Rubber Roller.

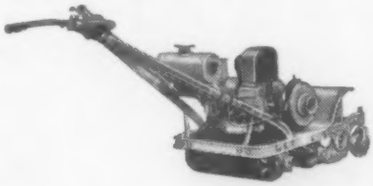
NEW IMPERIAL SPECIAL

A new leader in the Coldwell line of hand mowers:—the old Imperial completely modernized, with several new unusual features. A machine that will really last a lifetime. Width of cut, 16", 18" or 20". Equipped with steel flanges.



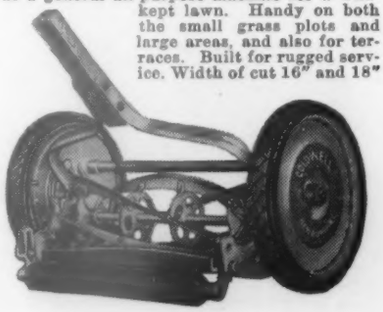
COLDWELL CUB REGULAR

A first-rate, all-'round machine with three speeds; single cylinder, water-cooled enclosed motor; oil pump forces oil to engine bearings, cylinders and mechanically operated valves; the ignition, a high-tension magneto specially water-proofed enabling motor to start readily; automotive type carburetor conveniently placed on motor. Width of cut 21". Other models similar to Cub Regular are L Junior Regular, De Luxe and Rubber Roller Models which have 25" cut. GRASS CATCHERS CAN BE FURNISHED FOR ALL COLDWELL POWER MOWERS.



DIPLOMAT SPECIAL

A quality hand mower of medium weight, equipped with semi-pneumatic tires. Useful as a general all-purpose machine for a well-kept lawn. Handy on both the small grass plots and large areas, and also for terraces. Built for rugged service. Width of cut 16" and 18"



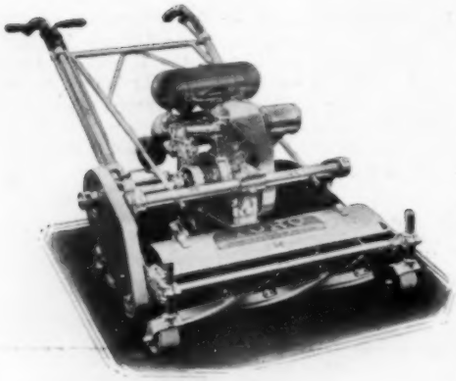
TORO MANUFACTURING CORPORATION

America's Largest Builders of Power Grass-Cutting Machinery

3042–3206 Snelling Ave., Minneapolis, Minn.

TRACTORS — POWER LAWN MOWERS — ROLLERS

Write for Complete Catalog



TORO PARK SPECIAL

The Park Special is a thoroughly dependable mower with a cutting swath of 30 inches and a capacity of four to six acres per day. Powered with the Toro Hi-Duty three horsepower, four-cycle motor, it will deliver faithful service over a long period of years. Will climb steep hills and cut the heaviest turf. Will handle diskers, drag mats, sickle bars, renovators, gang mowers and other attachments.

SNOW PLOW FOR PARK SPECIAL

Now You Can Use Your Mower Summer and Winter

This new Toro plow is of the moldboard single-blade type, fifty-four inches wide and twenty-one inches high. It is easily attached and detached by simply removing the cutting unit and bolting the plow directly to the chassis side members. The whole job can be done in 15 minutes.

The plow is held at the proper angle by means of a pull-out pivot pin. When retracing the same path, as a return trip on a sidewalk, the plow can be pivoted or swung from right to left and pinned in proper position.

Doubles the Usefulness of Your Toro Power Mower.

TORO IMPROVED POWER ROLLER

Eliminates tedious hand rolling for tennis courts and athletic fields. Rolling width 30 inches. Weighs with operator 1250 lbs. Speed up to 3½ M. P. H. Forward and reverse gear obviates constant turning. Toro standard 4-cycle, air-cooled motor . . . 3 H. P.

THE COLUMBIA ALKALI CORPORATION

Executive Sales Offices: 30 Rockefeller Plaza, New York, N. Y.

PLANT: Barberton, Ohio

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COLUMBIA CALCIUM CHLORIDE

Responsibility of school and university executives for the health and safety of those entrusted to their care will lead you to look into the benefits of COLUMBIA Calcium Chloride

FOR DUST PREVENTION—3C Calcium Chloride applied to driveways and adjacent highways will end the menace of germ laden dust in classrooms and keep lawns and shrubbery green and fresh. Easily applied, it is an effective and economical way to lay dust and maintain good surfaces on playgrounds, tennis courts, baseball diamonds and parking areas.

Two applications of 3C Calcium Chloride, one at the start of the dust season and the other six or eight weeks later, are usually sufficient, the property of the flakes to draw moisture from the air insuring a moist and compact surface.

TO MELT ICE—3C Calcium Chloride flakes spread on icy pavements, sidewalks, and steps will quickly melt the ice even in zero temperatures, and end this danger of personal injury. Abrasives treated with 3C Calcium Chloride when spread on slippery driveways imbed themselves in the ice and keep the surface skid-proof much longer than untreated sand and cinders.

COLUMBIA CALCIUM CHLORIDE comes in 100 lb. moisture proof paper bags and in 400 lb. steel drums. Write us for prices and the name of nearest distributor.

COLUMBIA SPECIAL CLEANSERS

COLUMBIA CLEANER AND CLEANSER is a specially prepared white powder for general hand cleaning operations, including glass, trays, dishes, walls, refrigerators, machinery, etc. It is widely used by schools, clubs, dairies, hospitals and restaurants.

COLUMBIA DETERGENT is a carefully blended mixture of the scouring type. It is recommended for cleaning enameled and painted surfaces, tile, marble and floors.

Send for special folders on COLUMBIA Calcium Chloride and COLUMBIA Special Cleansers.

SOCONY-VACUUM OIL COMPANY, INC.

STANDARD OIL OF NEW YORK DIVISION

26 Broadway, New York, N. Y.

The De Veaux School for Boys, Niagara Falls, N. Y.
Road Construction with Socony Asphalt Products

SOCONY ASPHALT BINDERS
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SOCONY ASPHALT PAVING FILLERS

Asphalt Macadam Roads

Asphalt Macadam Roads built by the Penetration Method are recognized by leading engineers as one of the most durable types of construction, being economical in cost and maintenance. This type presents a non-skid, all-weather surface, ideal for school and university grounds.

Socony Asphalt Binders "B" and "C" are widely used for such construction, in amounts varying from 2 to 3 gallons per square yard, being applied at temperatures ranging from 275 degrees to 350 degrees.

For Surface Treating of Gravel Roads and Paths

For economical treatment of dirt and gravel roads and paths, where it is desired to lay the dust and protect the surface with an Asphaltic mat, Socony Liquid Asphalts are produced in different grades to meet particular requirements. Socony Liquid Asphalts are usually applied in amounts varying from ¼- to ½-gallon per square yard and require a cover of sharp sand or clean gravel.

For Repairing Road and Path Surfaces

Socony Cold Patch Asphalt is an ideal patching material for repairing holes, ruts and depressions in all types of bituminous road surfaces. It is equally effective for restoring worn, uneven surfaces of brick and wood block pavements.

For each cubic yard of ½-inch to ¾-inch dry stone, we recommend the use of about 16 gallons of Socony Cold Patch Asphalt. Socony Cold Patch Asphalt is used without heating and is workable the year round.

For Filling Joints of Brick and Concrete Pavements

Socony Asphalt Paving Fillers (Standard Brand) for filling joints of brick, granite and concrete pavements are especially refined Asphalts of high melting point. We also supply Asphalt Fillers containing mineral matter. Either of these grades is poured or squeegeed to produce a rigid pavement.

ANCHOR POST FENCE COMPANY

Complete Line of Fences and Playground Equipment

Baltimore, Md.

SALES OFFICES IN PRINCIPAL CITIES

ANCHOR FENCES FOR SCHOOLS AND SCHOOL PLAYGROUNDS

The Anchor Post Fence Company has been serving public schools and colleges, municipalities and industrial plants with fencing and playground equipment to suit their various requirements for nearly half a century.

Anchor Chain Link Fences

Makers of America's first chain link fence, the Anchor Post Fence Company today manufactures a complete line, and will be glad to supply any interested school executive or architect with a copy of our Chain Link Fence Catalog containing full information about the four exclusive features which make an Anchor Chain Link Fence exceptionally attractive and durable. **Ask for Catalog No. 100.**

Anchor-Weld Iron Fences and Gates

Through the exclusive Anchor-Weld method of construction, the Anchor Post Fence Company is able to manufacture iron fences and gates which equal in appearance many expensive hand-wrought products. Many schools throughout the country are today justly proud of their beautiful Anchor-Weld Ornamental Iron Fences and Gates. Some of these are to be found illustrated in our **Catalog No. 102.**

Anchor Drive-Anchorage

Anchor's Four Exclusive Features

1. **ANCHOR-WELD WIRE GATE**—built with a frame of square tubular steel—arc-welded at the corners. The square shape of the heavy steel tubing, together with the welding of the corners, provides a framework of such exceptional strength that no re-enforcing diagonal braces are needed. We claim that this is the strongest and most attractive wire gate made.

2. **SQUARE TERMINAL POSTS**—stronger because they are square in section. More protective—having no fabric-holding bands and therefore providing no footholds for climbing. Better-looking—because of their graceful lines.

3. **U-BAR LINE POSTS**—made of high carbon steel and U-shaped in section to insure maximum strength.

4. **DRIVE-ANCHORAGE**—grips the soil like the roots of a tree. We have imitated nature's engineering by providing the line posts with a broad foundation. Anchor drive-anchors defy thaws, frosts and the many other strains to which a fence is subjected.

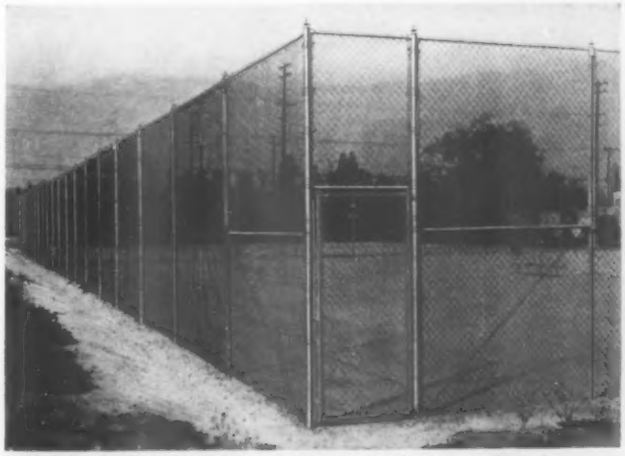
Note: While we strongly advocate the drive-anchor method of setting posts, we can, if desired, set our posts in concrete footings when conditions warrant such a procedure.

Anchor-Weld Wire Gate

Anchor Chain Link Fence with Top Rail
High School, Mineola, N. Y.

Anchor U-Bar Line Post

Anchor Square Terminal Post



Anchor Chain Link Tennis Court Enclosure at Pasadena High School, Pasadena, Calif.

Anchor-Weld Fence Surrounding the Hartford High School, Hartford, Conn.

THE COLORADO FUEL AND IRON CORPORATION

General Offices: Denver, Colorado Steel Works: Pueblo, Colorado

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Inquiries from California, Washington and Oregon should be directed to The California Wire Cloth Corp., 1245 Howard St., San Francisco, Calif.

Colorado
CHAIN LINK FENCE

A WESTERN STANDARD

The recognized standard in western educational institutions for complete, well tailored, enduring protection.

WESTERN MADE

Colorado Chain Link Fence is manufactured in the West for Western educational institutions that need the protection peculiar to Western Climatic conditions.

ADAPTABLE

Colorado Chain Link is used for athletic fields, playgrounds, school yards, back stops, tennis courts, dangerous power units near schools and all purposes for which school boards use protective fence.

SPECIFICATIONS

Fabric woven of copper-bearing open hearth steel wire containing not less than .20% copper by ladle analysis in No. 6, 9, 11 or 12½ gauge, in 2″ or 1¾″ chain link mesh galvanized before weaving or hot-dipped galvanized after weaving.

Standard height, 3′ to 12′. On heights 4′ and lower, one selvage is barbed. On heights 5′ and higher both selvages are barbed, except for court fences.

Pipe line-posts are 1⅝″, 2″ or 2½″ pipe.

H-beam line posts, hot-dipped copper-bearing steel, 2.25″x1.95″ or 1.875″x1.5″. Line post spaced not over 10 feet apart.

Top rail, 1⅜″ or 1⅝″ pipe, run continuously through openings in line post tops and coupled together with self-centering sleeves. Securely fastened to end, gate and corner posts with malleable iron or pressed steel connections.

Terminal posts 2½″x2½″x¼″ angle or 2″, 2½″, 3″, 4″ or 6⅝″ pipe. Furnished complete with necessary fittings and length to set 30″ in concrete for fences 4′ and lower and 36″ in concrete for fences 5′ and higher.

Diagonal braces of 1⅝″ pipe for 5′ fence without top rail, and for all fence over 5′ high, one for each end and gate post. Each corner and pull post equipped with two horizontal braces of 1⅝″ pipe securely fastened to terminal post and first line post.

In gates all joints are welded to provide a one-piece rigid frame construction and to exclude moisture from inside of gate frame. Gates properly braced and trussed to prevent sagging, buckling and weaving, and furnished complete with necessary fittings.

CATALOG AND INFORMATION

Put your fence problems before us. Write to nearest district office or general office for catalog. Ask for information and counsel with no obligation on your part and prompt reply will be given. The West serves the West.

CONTINENTAL STEEL CORPORATION

Manufacturers of Chain Link Fence for All Purposes

General Office: Kokomo, Indiana

SALES OFFICES IN FOLLOWING CITIES:

Columbus; Canton; Buffalo; Detroit; Minneapolis; Indianapolis; Moline; New York; Chicago; Grand Rapids; Cleveland; Dayton; Des Moines; Ft. Wayne; South Bend; Evansville; Kansas City; Louisville; Omaha; Pittsburgh; Philadelphia; St. Louis; Tulsa; Oklahoma City; Atlanta; San Francisco; Denver; Wichita; Lexington, Ky.; Owensboro, Ky.; Alexandria, La.; New Orleans; Baltimore; Muskegon, Mich.; St. Paul; Winona, Minn.; Charlotte; Toledo; Chattanooga; Nashville; Austin, Texas; Dallas; El Paso; San Antonio; Salt Lake City; Norfolk; Richmond; Huntington; Clarksburg; Manitowoc, Wis.; Boston

14 CONSTRUCTION FEATURES

- ★ Fabric of *KONIK steel containing copper, nickel and chromium. *(U. S. Patent No. 1874814)
- ★ Heavy coating of zinc applied by a special process.
- ★ Full gauge wire woven in exact mesh.
- ★ Heavier "H" Section Line Posts.
- ★ Self Locking Barb Arms.
- ★ Heavier Post Caps and Arms.
- ★ More Post and Top Rail Ties.
- ★ Inside - Outside Top Rail Coupling.
- ★ New Type Lock Pin Eliminating Bolts and Nuts for Tension Bands.
- ★ Stronger and more easily operated Gates and Locking Devices.
- ★ Improved Pivot Type Hinge.
- ★ Quality Materials, each part designed for its particular place.
- ★ Engineered and erected for each specific job.
- ★ Continental CERTIFIED QUALITY materials and workmanship throughout.

The wide selection in styles, heights, types of top construction, gates and accessories makes it possible for Continental to provide the most modern fence protection for any school. This modern fence has heavier, sturdier posts, improved brace construction, more rust-proof fabric ties, and strong easily opened gates equipped with effective locking devices.

Made of Konik Steel

The fabric used in Continental Chain Link Fence is made of KONIK STEEL — CONTAINING COPPER, NICKEL AND CHROMIUM FOR GREATER STRENGTH AND RUST RESISTANCE CLEAR THROUGH. KONIK has higher tensile strength, and carries a heavy zinc coating applied by hot dip with special process to insure uniformity and adhesion of coating.

Engineering and Erection Service

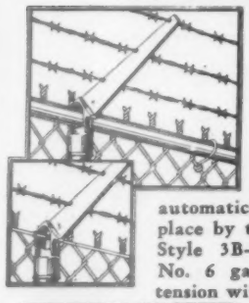
Our engineers are prepared to assist you in laying out the most economical installation for your purposes. Trained erection crews are available anywhere for correct and economical construction. When local labor is used Continental will supply competent foreman and inspection service.

Write For Free Manual

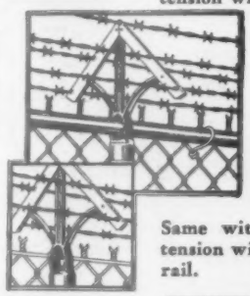
Get a copy of "Planned Protection", a complete manual on modern protection of property and control of traffic. Write or phone the Continental Steel Corporation, or the nearest sales office.

CONTINENTAL STEEL CORPORATION
KOKOMO, INDIANA
PLANTS at Kokomo, Indianapolis and Canton

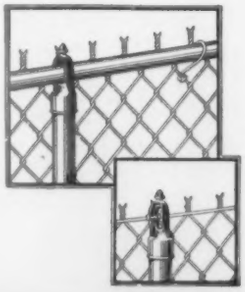
A STYLE TO MEET EVERY SCHOOL NEED



Style 3B - R— Three strands of barb wire with top rail. Arm of 12 gauge pressed steel. Barb wire held in angle slots and automatically locked in place by tension.
Style 3B-W—Same with No. 6 gauge coil spring tension wire instead of top rail.



Style 5B - R— Five strands of barb wire with top rail. Top rail of tubular steel 1⅝" O.D. Has 7" expansion sleeves.
Style 5B - W— Same with No. 6 gauge tension wire instead of top rail.



Style NB - R— No barb wire with top rail.
Style NB-W— Same with No. 6 gauge tension wire instead of top rail.

CONTINENTAL *Chain Link* FENCE

CYCLONE FENCE COMPANY

UNITED STATES STEEL

General Office: Waukegan, Illinois

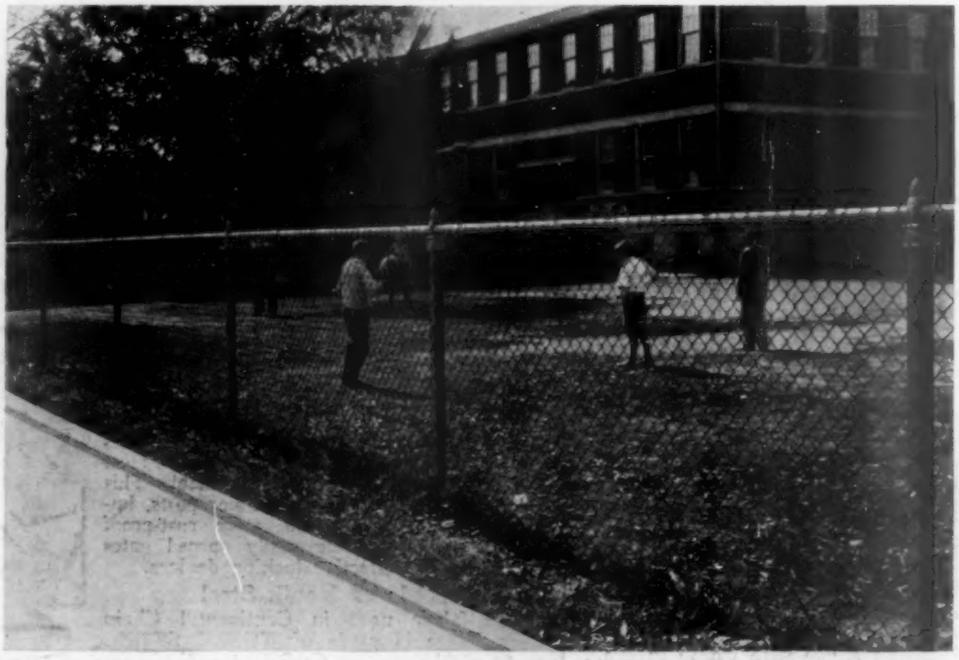
North Chicago, Ill. Waukegan, Ill. | Cleveland, Ohio Newark, N. J. | Fort Worth, Texas Greensburg, Ind. | Tecumseh, Mich. DeKalb, Ill.

PACIFIC COAST DIVISION
STANDARD FENCE COMPANY

Los Angeles | San Francisco | Oakland, Calif. | Portland, Ore. | Seattle, Wash.

Cyclone Fence is produced and erected by the world's largest manufacturers of property protection fencing. For years the Cyclone Fence Company has specialized in fencing school property. Cyclone Fence is the recognized standard for every school and playground purpose.

Enclose your school grounds with genuine Cyclone Fence to provide maximum protection for your school children.



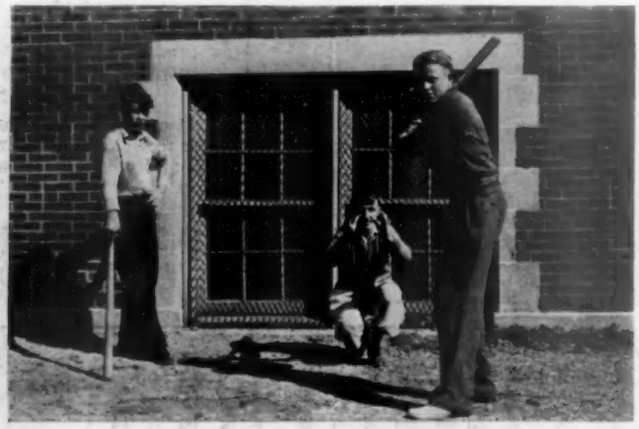
Cyclone Safeguard Chain Link Fence for School Grounds, Playgrounds, Parks, Institutions, Etc.

Fence your school Athletic Field with Cyclone and get more paid admissions to every game.

Because of its long, trouble-free service, you will find Cyclone Fence most economical in the end.

Learn how to test the value of any chain link fabric **before you buy.** Ask for a copy of the booklet "Fence—How to Choose It—How to Use It" and the Cyclone "12m" folder which shows how Cyclone's "12m" process of extra heavy galvanizing means longer fence life at small extra cost.

Cyclone Invincible Chain Link Fence for Athletic Fields



Cyclone Window Guards are sturdy—save money

W. F. ROBERTSON STEEL & IRON COMPANY

Robertson-Cincinnati Chain Link Fence

Second and Elm Streets, Cincinnati, Ohio

PRODUCTS

Robertson Chain Link Fence and Chain Link Gates for Tennis Courts, Athletic Fields, Swimming Pools, etc.

Robertson Chain Link Fencing

Fabric is permanent, pleasing in appearance, and offers the maximum protection for your school children.

Robertson Non-Climbable Chain Link Fence

is available in all styles to serve every purpose—tennis court backstops, athletic field and swimming pool enclosures, etc.

Styles 400 and 500

Standard Types

Robertson Styles 400 and 500, built in heights 3 feet to 12 feet, are sturdy, dependable enclosures in every detail.

Robertson Styles 800 and 900 are recognized as the ideal constructions for Tennis Court Backstop Fences. They are available in three heights—8, 10 and 12 feet.

Robertson Styles 600 and 700 are recommended for enclosing Athletic Fields. These styles have extension arms carrying three or five strands of barbed wire, as preferred. On the five-strand construction, the barbed wire extends on both sides of the fence line. Either style can be furnished in any height up to 12 feet (standard height 7 feet overall, including barbed wire).

Robertson Chain Link Construction

Fabric is made of copper bearing steel of unusually high tensile strength, heavily galvanized by the hot dip process after woven, to meet any requirements. **Line Posts** are available in either the H-section style, weighing 4.3 pounds per foot, or 2½″ O.D. tubular pipe construction weighing 3.65 pounds per foot. **Top Rail** is 1⅝″ O.D. tubular steel pipe weighing 2.27 pounds per foot. **End and Corner Posts** are made from 3″ O.D. tubular steel pipe weighing 5.79 pounds per foot, all manufactured from copper bearing steel, galvanized by the hot dip process. **Barbed Wire** is 4-point pattern hot-dip-galvanized after fabricated.

Style 900 for Tennis Courts

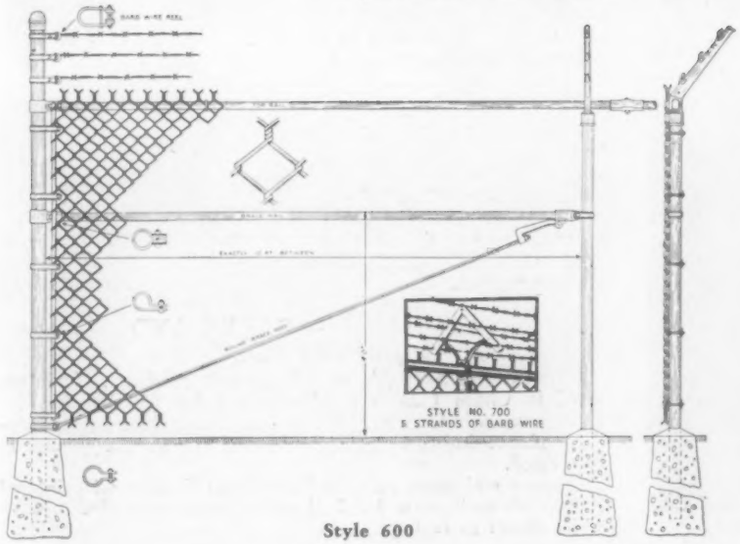
Robertson Chain Link Gates

are heavily constructed, and corners are fitted with malleable iron castings are electrically welded. The Gates can be furnished in all widths, single or double style, swing or slide type.

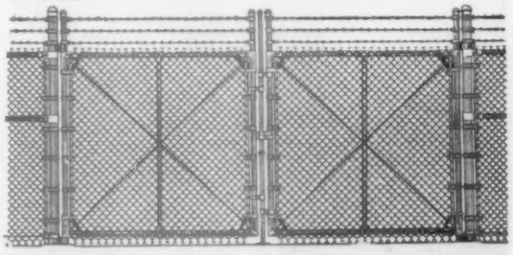
Quality and Service

have been the keynotes to Robertson success in chain link fence manufacture. Only the finest grades of steel and malleables are used. Our Engineers are available at all times to help you solve your problems, without charge or obligation.

Let us submit estimates with or without erecting service.



Style 600



ROBERTSON standard Heavy Duty Style 600 double swing gates, with 2″ O.D. hot galvanized pipe frames. Equipped with latching device with arrangement for padlock

THE STEWART IRON WORKS COMPANY

"Fence Builders to America Since 1886" INCORPORATED

703 Stewart Block, Cincinnati, Ohio

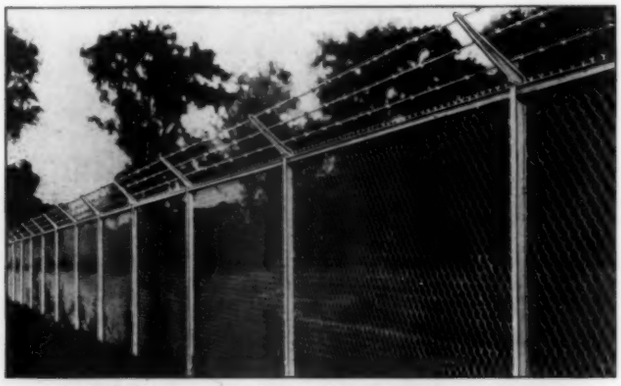
PRODUCTS
Bronze Tablets
Chain Link Wire Fence and Gates
Flag Poles
Folding Chairs
Folding Gates

PRODUCTS
Iron Fence and Gates
Pipe Railing
Settees
Stadium Seat Brackets
Window Guards
Wire Mesh Partitions

FOR EVERY PURPOSE

Stewart offers Plain or Ornamental Iron and Chain Link Wire Fence and Gates for front, side and rear property lines; for athletic fields, tennis courts, recreation grounds and other school requirements.

Stewart Chain Link Wire Fence is the only ALL BEAM FRAMEWORK construction on the market. The Chain Link Wire Fence illustration below clearly



Typical Stewart School Installation, Vincennes, Indiana

shows this exclusive feature. Notice the Oval-Back I-Beam Line Post with integral extension arm. Obviously this solid post is superior to pipe or other types of post requiring a separate pressed steel arm which may be removed or easily broken. Notice, too, how the beam top rail passes through the post itself—eliminating the need for fittings. The flat, smooth surfaces of Stewart All Beam construction offer maximum resistance to wear, weather and corrosion. This

Typical Stewart School Installation, Cleveland, Ohio

type of fence structure, exclusive with Stewart, is unquestionably the heaviest and strongest manufactured.

Usual heights of style 3-TH shown in illustration are 7 ft. and 8 ft. overall. All materials are of Copper-Bearing Steel hot-dipped galvanized **after** fabrication to assure greatest possible resistance to rust.

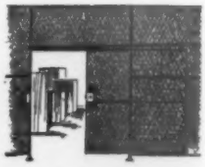
IRON FENCES AND GATES

For front property lines where dignity as well as protection is a requisite, Stewart offers a multiplicity of designs in plain or highly ornate iron. Here again Stewart construction is unique. The patented channel rail, exclusive with Stewart, adds immeasurably to the strength of the fence. All fittings are of Stewart design—the result of more than 54 years' experience and research in the fence building field.

METAL FOLDING CHAIRS

Built of strong steel channels. Full size seat with correctly pitched form-fitting back. Stewart Metal Folding Chairs are tip-proof. Standard finishes are: Black, Brown, Dark Green, Mahogany or Taupe. Literature and prices furnished upon request.

WIRE PARTITIONS



Effective and economical enclosures for locker rooms, stock rooms, supply rooms, tool rooms, machinery, power houses, etc. When writing for prices please send sketch giving measurements.

BACKSTOPS

Ideal for hard or soft baseball diamonds, tennis and badminton courts, etc. Sturdily constructed to stand the toughest abuse. Literature and prices furnished on request.

BRONZE PLAQUES

Plaques and tablets of hand-chased cast bronze, are available in stock sizes from 9" x 16" to 24" x 36". Special sizes will be made to order. Literature and prices gladly sent on request.

CATALOGS—SALES AND ERECTION SERVICE

Literature is available on all Stewart products. If interested in Chain Link Wire Fence ask for Catalog No. 79. If in Iron, ask for Catalog No. 76. When requesting catalogs, please indicate products in which you are primarily interested.

Stewart maintains sales and erection offices in all principal cities. Consult your local classified telephone directory or write direct to factory.

WICKWIRE SPENCER STEEL COMPANY

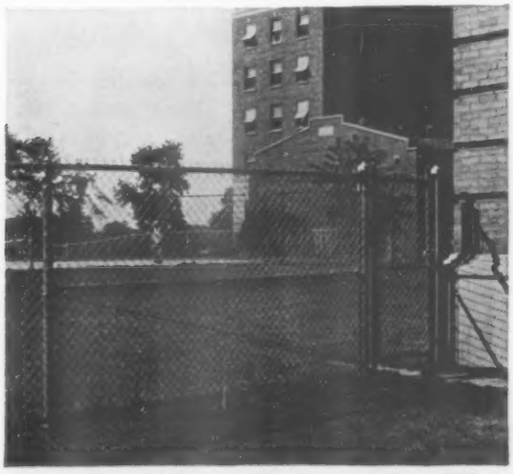
General Sales Office (Fence Dept.), 70 Niagara St., Buffalo, N. Y.

DISTRICT SALES OFFICES

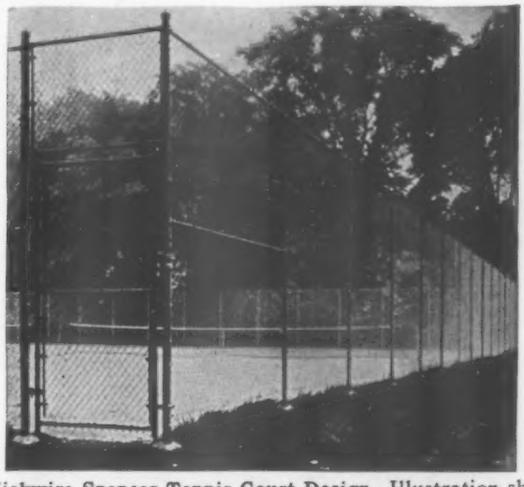
New York City Chicago Worcester San Francisco Los Angeles Portland Seattle

DISTRIBUTORS AND ERECTORS IN ALL PRINCIPAL CITIES

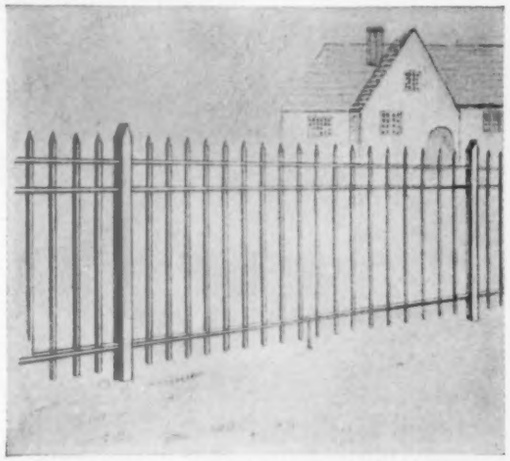
THE Wickwire Spencer Steel Company offers Chain Link Fences for all types of property, including schools, playgrounds, athletic fields, tennis courts, etc. Manufactured entirely in their own plants with complete control from mine to consumer. Sold with complete installation, or if preferred, we will furnish all necessary materials to be installed by others or with the services of a supervising foreman. All posts are furnished to set in concrete footings. (Concrete preserves the metals from corrosion below the surface.) All materials except non-ferrous metals are hot galvanized after fabrication.



Wickwire Spencer Type 420H Fence, using "H" section line, end, corner and gate posts. A design virtually foolproof as no bolts or nuts are exposed for possible tampering. Gates of similar construction using heavy square tubing with specially reinforced heavy hinges and locking devices. If desired, this type of fence is available with copper bearing pipe posts throughout.



Wickwire Spencer Tennis Court Design. Illustration shows a typical Tennis Court Fence design. Two types are available—310 (light construction) and 420 (heavy construction). Standard heights, 8′, 10′ and 12′.



Wickwire Spencer Iron Picket Fence. We can furnish stock or special designs to conform with your wishes.

Wickwire Spencer Type 423 Fence with three strands of barbed wire. Illustration shows pipe posts throughout. Gates to match. This type is also available with "H" posts same as shown in Type 420H illustration, with gates of similar construction.

Write to this office direct, or to any of our district offices shown above, for catalogs, and full particulars. Distributors may be located near you. Ask us who they are. Estimates and engineering services will be furnished without any obligation on your part.

SECTION VI
PHYSICAL EDUCATION AND ATHLETICS

PHYSICAL EDUCATION FACILITIES FOR THE COLLEGE WOMEN OF TOMORROW

By RUTH ELLIOTT HOUSTON

Professor of Health Education and Director of Gymnasium, State Teachers College, Buffalo, N. Y.

DID the children who trudged along a dusty road to the little red schoolhouse ever dream that their grandchildren would ride in air-conditioned buses along paved highways to a centralized school? Did Dr. James Naismith ever vision thousands of adolescent boys and girls and countless college men and women playing the game he invented with a peach-basket and a soccer ball? Did the boys who sought the old swimming-hole ever imagine that their granddaughters would be taught swimming as a part of college instruction in a tile-lined swimming pool? An emphatic No to each of these questions causes us to pause before the picture each one presents.

Just as some of the educational ideas of the nineteenth century appear amusing and illogical to us, so will educational fashions, customs, and traditions of the first half of the twentieth century appear equally amusing to those who will live in the latter half of this era. Many of the so-called frills of an earlier day will become the necessities of the days to come, requiring material expansion wholly undreamed-of in previous days.

Although we need to give credit to the early Greeks as ancestors of physical education, the present vigorous offspring definitely became a member of the educational family in the latter part of the nineteenth century.

Yesterday's Physical Education for Women

From the earliest days of that startling venture of college training for women, it was conceded that bodily activity had a definite bearing upon the welfare of young women. Consequently, required work in gymnastics was a part of every college course. Sports were more or less voluntary; tennis claimed the major attention prior to 1900. If a natural waterway within a campus made boating possible, that activity had its devotees, as did also skating, if climatic conditions permitted. These were carried on by means of clubs and had little or no relation to the organized work in the department of physical education, which concerned itself largely with adaptations of foreign systems of body movements, frequently intensified by the use of dumb-bells, Indian clubs, wands, balance beam, buck, climbing ropes, ladders, and vaulting horse.

At the turn of the century, college administrators became more conscious of the value of physical education; departments were organized to fit into the general scheme of education; and courses in four major divisions became more common, i.e., gymnastics, folk-dancing, swimming, and a few sports. Gymnastics retained many of its early elements, although more attention was paid to the definite need of the individual, based upon a medical and physical examination. Folk-dancing concerned itself with the rhythmic ideas brought from many European countries. Swimming was usually restricted to a very limited "swimming tank," without much regard to the sanitation of the bathers, the equipment, and construction of the tank. Archery had come from an ancient Old World background; basket-ball had recently been devised, but was not entirely satisfactory for women's use; hockey was a popular imported sport; tennis retained its supremacy, partly by virtue of its seniority and partly by its inherent values; track was largely an imitation of some forms of sport better adapted to men.

By 1915 the range of activities had increased to such an extent that departments found it necessary to reorganize upon two general principles, namely, the health of the student, and seasonal choice of activities. The rating of the former was based upon the medical and physical examination, by means of

which a student was classified as A, B, C, or D. A indicated excellent physical condition, permitting selection of the most vigorous types of activities; B rating offered some limitation; C, increased limitation; and D indicated special work for remedying definite defects or deficiencies. The latter principle was based on the organization of activities according to season and available areas. Those usually offered in the fall were tennis, hockey, lacrosse, soccer, track; in the winter, basket-ball, dancing, fencing, gymnastics, swimming; in the spring, archery, baseball, canoeing, crew, golf, and volley-ball.

Today's Activities

At present a student is expected in her four years to become proficient in one or more dual activities that she can enjoy with one or two others, such as archery, badminton, golf, tennis, swimming, water sports, and with a team sport such as baseball, basket-ball, hockey, soccer; also a variety of dance forms that may include folk, clog, tap, modern, natural, and social dancing.

The last ten years have shown a surprising increase in the number and kinds of activities that have been offered to the college woman. The accompanying chart indicates the general changes in program by five-year intervals from 1900 to 1940.*

The Problem of Expansion

This expansion has created a definite problem, for specialized areas and facilities are necessary to the administration of the modern program. It has likewise called forth new ideas in buildings and outdoor areas.

There still exists on college campuses a variety of antiquated facilities, such as: a single room, too often in the basement of a building; a makeshift area made by the removal of partitions between former classrooms, creating a poorly proportioned area for activity, and too frequently one that offers disturbance to other classes; the questionable inheritance of a gymnasium once used by men, when masculine needs are met by a new structure; limited outdoor areas that in no way satisfy the needs of the program; or, if adequate in area, too far removed from campus facilities to be wholly satisfactory.

Personal visits by the author to more than fifty colleges and universities throughout the country have thrown much light upon present needs for facilities to meet the expanding and justifiable program in physical education for both men and women. There are similar fundamental principles for both, upon which a program should be built and facilities should be planned; there are also differentiated problems which should clearly indicate major differences in facilities. Likewise, climate, natural resources, topography of a campus, and the location of buildings already in use, must play a definite rôle.

	1900 to 1905	1905 to 1910	1910 to 1915	1915 to 1920	1920 to 1925	1925 to 1930	1930 to 1935	1935 to 1940
Gymnastics	×	×	×	×	×	×	×	×
Corrective or medical	×	×	×	×	×	×	×	×
Swedish gymnastics	×	×	×	×	..	..	..	..
Danish gymnastics	..	..	..	..	×	×	..	..
Dancing								
Folk	×	×	×	×	×	×	×	×
Esthetic	..	..	×	×	×	..	..	..
Clog and tap	..	..	..	×	×	×	×	×
Natural	..	..	..	×	×	×	×	×
Dance drama	..	..	..	..	×	×	×	×
Modern	..	..	..	..	..	×	×	×
Social (coeducational)	..	..	..	..	..	..	..	×
Sports								
Archery	×	×	×	×	×	×	×	×
Baseball	..	..	×	×	×	×	×	×
Basket-ball	×	×	×	×	×	×	×	×
Fencing	..	×	×	×	×	×	×	×
Golf	..	..	..	×	×	×	×	×
Hiking	×	×	×	×	×	×	×	×
Hockey (field)	×	×	×	×	×	×	×	×
Riflery	..	..	..	×	×	×	×	×
Tennis	×	×	×	×	×	×	×	×
Track	×	×	×	×	×	..	..	..
Volley-ball	..	..	..	×	×	×	×	×
Water sports								
Canoeing or rowing	×	×	×	×	×	×	×	×
Swimming	×	×	×	×	×	×	×	×
Crew	..	..	×	×	×	×	×	×
Diving	..	..	..	×	×	×	×	×
Life saving	..	..	..	×	×	×	×	×
Sailing	..	..	..	..	..	..	..	×
Camp craft	..	..	..	..	×	×	×	×
Horseback riding	..	..	..	..	×	×	×	×
Soccer	..	..	..	..	×	×	×	×
Lacrosse	..	..	..	..	..	×	×	×
Speedball	..	..	..	..	..	×	×	×
Squash	..	..	..	..	..	×	×	×
Badminton	..	..	..	..	..	..	×	×
Bowling	..	..	..	..	..	..	×	×
Ice and snow sports	..	..	..	..	..	..	×	×
Mountain climbing	..	..	..	..	..	..	×	×
Shuffleboard	..	..	..	..	..	..	×	×
Deck tennis	..	..	..	..	..	..	×	×
Table tennis	..	..	..	..	..	..	×	×
Tumbling	..	..	..	..	..	..	×	×

Scattered about the country today are many fine examples of facilities that are meeting the needs of physical education departments for women in a most admirable manner. These show that college administrators and boards of trustees have grasped the real function of this phase of education and have built with vision. They likewise indicate that the governing body has faced and has met the problem of financial outlay in relation to the present and future enrolment, in some cases delaying the erection of a building until an adequate structure is possible.

Location and Architecture of the Recreation Building

These questions settled, the administration must next consider the general location of the building.

*An approximate table compiled from seven individual college tables from "Modern Trends in Physical Education Facilities for College Women," by Ruth Elliott Houston. Copyright 1939, by A. S. Barnes and Company Incorporated.

Since outdoor activities require many times the area of indoor activities, the former should be as accessible as possible to the latter. This consideration then makes necessary a location on the edge of the campus or on land reserved for expansion. If the general building program is so organized that women's dormitories or living arrangements are in a specified area, it is well to place the physical education headquarters within reasonable distance. If there is a lake or waterway so controlled that boating and skating are possible, this may be taken into account.

The style of architecture should follow one of two principles. If the college policy adheres to a general type both in style and structural material, that idea should be retained as far as it is adapted to the function of the building. This is exemplified by the University of Washington, which has employed a modified Tudor-Gothic style in a specially made brick known as University Mixture (Illustration No. 1); by Leland Stanford Junior University, which has retained the major features of its earlier buildings but has eliminated long colonnades to provide better illumination, and has added a Moorish influence in style (Illustration No. 2); by the University of California at Los Angeles, which has become a distinctive campus by employing an adaptation of Italian-Romanesque architecture, each building conforming to this type but differing from every other building in certain notable features (Illustration No. 3).

On the other hand, if the college policy permits individualistic treatment in the style of each building, or the use of modernistic structural principles, Hearst Memorial Gymnasium on the University of California campus exemplifies the former (Illustration No. 4), and the recently opened Wellesley College Recreation Building and Hales Memorial at Oberlin College exemplify the latter (Illustration No. 5).

General Layout of the Building

Because of the diversified uses of the building, the planning should be based upon seven or eight units: (1) administration; (2) unrestricted floor areas for individual and group activities; (3) rhythm or dance studio; (4) corrective or remedial unit; (5) swimming pool; (6) dressing facilities and service rooms; (7) classrooms and library, if the work of the department justifies such; (8) miscellaneous, such as Athletic Association Board room, bowling-alleys, photographic room, rest room with cots, squash courts, facilities for faculty men and women and for men guests, especially if the college is not coeducational.

The administrative unit should be the first point of contact upon entering the building, its size being determined by student enrolment, staff, and needs of the department. There should be a general office from which one may obtain information regarding classes and activities, and in which departmental records are kept. The office of the director of the department should adjoin this. Other staff offices should be readily accessible. In some well-planned buildings these open from an accessory hallway in order to lessen disturbance through the noise created by certain nearby activities. The staff should be provided with dressing and shower facilities. If space warrants, a staff room offers a happy social and conference aspect. A private outside entrance to and exit from the director's office may sometimes prove convenient. Such has been provided in Scott Gymnasium of Smith College and Hales Memorial of Oberlin College.

Certain offices should definitely be located adjacent to a particular area; that is, the person having the major responsibility of swimming should have her office in conjunction with the pool. If it is advisable to have the Health Service within the building, conference offices, examining rooms and necessary laboratories could be a part of the administrative section, as at Leland Stanford Junior University. A social lounge with equipment for serving refreshments is being recognized as a definite asset to a building; its location depends upon the functioning of various areas, but may well be considered within the administrative unit. (Illustration No. 6.)

At the turn of the century, the program and average enrolment were satisfied by one unrestricted area. Such is no longer the case. Space is now needed for a variety of individual activities, such as badminton, battle-board tennis, deck tennis, fencing, shuffle-board, and for team games such as indoor baseball, basket-ball and volley-ball, together with many forms of group activity needing an open area. A floor, 60 x 100 feet, should be the minimum size, providing for two basket-ball courts at one time, four badminton courts at another time, or other specific game areas.

Illumination—Floors

Illumination of such rooms presents both a structural and a heating problem. The advances made in glass as a building fabric will probably soon alter window construction. Hales Memorial (Illustration No. 7) is supplied with Factrolite wire glass. On the south and west exposures both sides of this fabric have been acid-etched to break the glare of sunlight. Too often, tall windows have caused such uneven and glaring reflections upon the floor surface that visibility has been sacrificed to volume and intensity of light. In Kenyon Hall of Vassar College this has been remedied by curtains of monk's

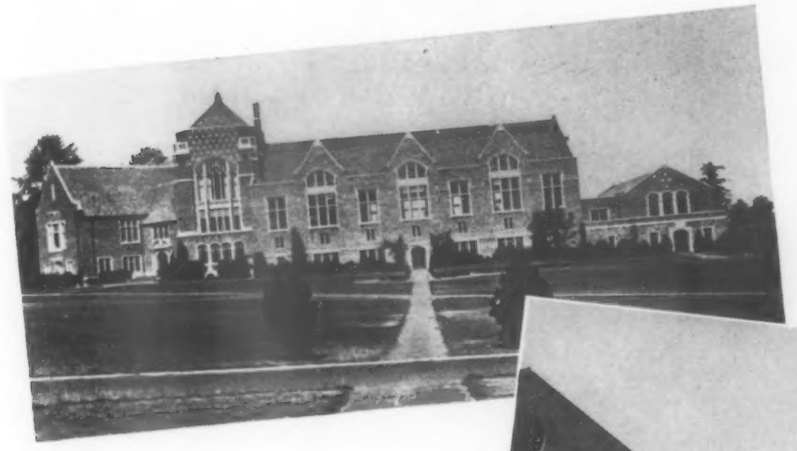


Fig. 1

The University of Washington used a modified Tudor-Gothic style in constructing its women's gymnasium

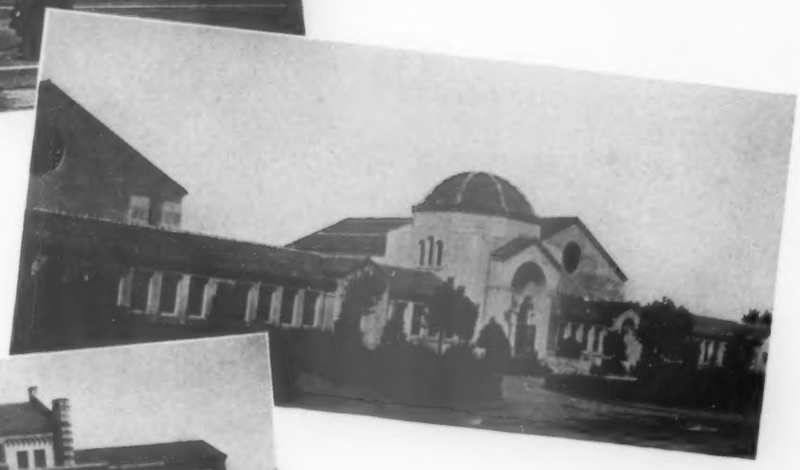


Fig. 2

A Moorish influence is apparent in the design of the women's gymnasium at Leland Stanford Junior University

Fig. 3

Hearst Memorial Gymnasium, like other buildings on the Los Angeles campus of the University of California, conforms in general to the Italian-Romanesque style

Fig. 4

The main pool of the Hearst Memorial Gymnasium shows the possibility of individualistic treatment in the style of the various buildings on a campus

Fig. 5

Hales Memorial Gymnasium at Oberlin College is a good example of the use of modernistic structural principles

Courtesy of Oberlin College

cloth (Illustration No. 8). The expanse of glass may increase the heating cost, but it must be kept in mind that such a room should not be heated to the degree of some other rooms in the building. Participants in an activity quickly raise their own temperature to offset the lessened degree.

The walls of this room should be sound-absorbent, flat, and unobstructed to a minimum height of 7 feet from the floor, so that they may be used for tennis practice and other types of ball contact without damage to windows. It would be advantageous to have a 3-inch color band parallel to and 3 feet 6 inches from the floor to represent the maximum height of a tennis net.

The construction and material of the floor should be such that resiliency and hard wear are definite goals. The former may be gained by "sleeper construction," permitting air spaces to take the shock of use, and the latter by hard maple. A final dressing that combines smoothness and grip should be applied. The problem of using the floor for activity and ballroom dancing is one of constant concern to those in charge.

Although the rôle of participant is more prominent than that of spectator in women's activities, the latter should receive consideration. Well-designed portable benches or bleachers folding into a recessed wall and thus presenting a flat surface should be available. Some indication of a restricted area for spectators should be a definite feature. Traffic in the building should be so planned that it should not be necessary to cross any part of an open class floor to go to another part of the building, nor should this be a common practice of participants. A storage room for equipment should adjoin this room. Anchor plates should be set in walls and floor for attachment of nets and net posts. Because of the decided change in program, one looks in vain for the hanging apparatus, the wall racks for hand apparatus, the heavy vaulting horse, and parallel bars.

Since dancing is finding a larger place in the modern program, there is need for an area devoted solely to its various forms. Although the floor construction may logically be the same as in the main activity area, the wall treatment may add to the artistic and creative efforts of students. Long draperies of soft neutral shade have been found effective, such as those used at the University of Texas (Illustration No. 9).* A storage room for the commonly used percussion instruments, and a costume closet, may prove great assets.

If the financial outlay is too great to provide separate areas for sports and dancing, the problem becomes one of administration as to what proportion of time should be allotted to each phase of activity. Since a dance studio is the most recent need of all the indoor areas, it has not yet received the attention it deserves.

The remedial or corrective room should be a minimum size, 30 x 50 feet, equipped with hanging, portable, and wall apparatus necessary to its function. The nature of the work suggests small groups so that the individual student may receive proper consideration of her particular problem; it likewise suggests more privacy, a factor that should be kept in mind concerning location. An adjoining office for the person directing the work is highly advisable.

The Swimming Pool

The modern swimming pool presents quite a different picture from any pools that were installed prior to 1920. Although swimming has been in the college program for many decades, construction of pools has been in the hands of those not well versed in the many phases of education and sanitation involved in their operation. Formerly, a pool was in the basement of a building, poorly lighted, and inadequate as to size. The new type has come into its own, in both elevation and size, and swimming has become one of the major offerings in a program.

More definite problems arise in the construction and maintenance of a swimming pool than in any other unit of physical education facilities. In part, these are concerned with: function; cost of erection and maintenance; location in relation to other units; materials of construction; compliance with local and state health laws; safety; operating principles; and conduct of all persons supervising, working in, or using the pool. A few general suggestions concerning each of these may be given.

Designed for college women, its function is educational and recreational. However, it should be kept in mind that its use may be extended to children of all ages and to adult groups; also, that it may be used for exhibition purposes and for meets conforming to the regulations established by the National Amateur Athletic Union.

Because the cost of construction is high, some colleges make provision for a pool in the general plans, but defer the erection until funds are available for a properly built pool. Shower rooms and dressing facilities are planned with this future construction in view, as in the case of Sweet Briar College. Oberlin College erected Crane Swimming Pool nine years prior to the erection of Hales Memorial, but located it in relation to the prospective building to which it has now been joined. Already in possession of one outdoor pool, Leland Stanford Junior University has

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Fig. 6

The University of Washington made provision for an attractive lounge in planning its women's gymnasium

Fig. 7

The wire-glass windows of this gymnasium at Oberlin College have been acid-etched to diminish glare

Fig. 8

In the Vassar gymnasium, monk's-cloth curtains can be pulled across the tall windows when necessary to shut out blinding sunlight

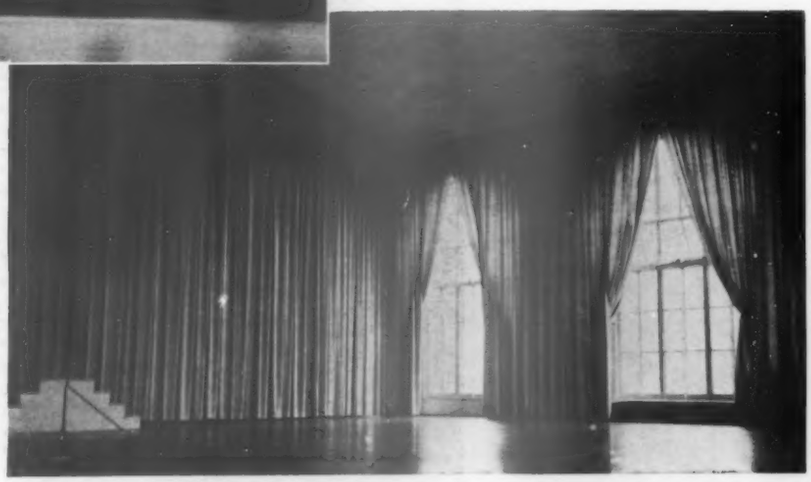


Fig. 9

Long draperies add to the artistic effect of the dance studio at the University of Texas

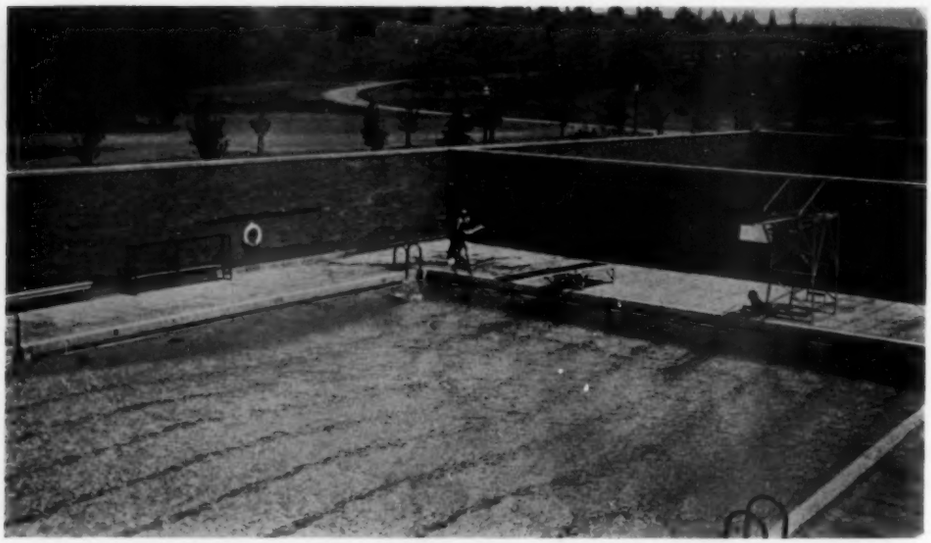


Fig. 10

Outdoor swimming pool in connection with the women's gymnasium on the Los Angeles campus of the University of California

planned for two more pools, for which some of the plumbing has already been installed. Because of the increasing interest of all ages in swimming, and because of the lure of outdoor swimming in summer, this unit commends itself as one of the most desirable.

Maintenance cost involves water, heat, light, chemical control; service of various types of people such as instructor, lifeguard, matron, chemist, engineer, janitor; purchase and care of suits, towels, and cleansing agents. Basic cost should emphasize sound construction and proper maintenance, and should never be sacrificed to external appearance or embellishments, however much these may add to the esthetic enjoyment of the pool.

The location should depend upon its relation to other units of the building, but the elevation of the pool basin should be such that the water line is definitely above ground level. Some colleges are geographically situated so that an outdoor pool gives satisfaction, but this discussion is confined to factors of an indoor pool. (Illustration No. 10.) An outside entrance is essential, so that spectators for meets and exhibitions may go into an area reserved for them without entering other parts of the building. (In Illustrations No. 1 and No. 14 the pool at the extreme right shows this feature.) This entrance should be so placed that the temperature of the pool is not affected. If the spectators' gallery is to be limited to one side, it should run the length of the pool, for ease of visibility. It should be so separated from the swimmer's area that no interchange of position is possible. An instructor's office should overlook the pool with full visibility and should preferably be placed at the deep end. These features are admirably considered in the University of Texas pool. Not only may the instructor see all parts of the pool through the ample window of her office, but she may step upon the pool deck either from the shower room

Fig. 11

The indoor pool at the University of Texas

connected with the office or through a door opening from the office (Illustration No. 11).

The length within the water area should be 75 feet, conforming to the standards of the N.A.A.U.; a satisfactory width would be 35 feet and may be as much as 60 feet, if cost and function justify such, as in the case of the University of Southern California. The depth should range from 4 feet to a minimum of 10 feet off the springboard. The longitudinal deck should be at least 6 feet wide; the deck at each end at least 10 feet wide for springboard space and racing starts. Crane Swimming Pool of Oberlin College has a commendable double feature; a smaller pool being for beginners and those needing warmer water; the larger, 30 x 75 feet, having greater depth throughout, and water of cooler temperature (Illustration No. 12).

Impervious, non-corrosive, and enduring materials should be employed. Tiling of contrasting and pleasing shades should mark swimming lanes, distances, and various depths. Long windows, perhaps of glass brick or etched glass, should be as numerous as possible, and should extend no closer than 5 feet above the deck floor to avoid chilling of bathers and water. The walls and ceiling should be acoustically treated. Recessed steps at the four corners of the pool basin, and a scum gutter completely around the pool, should be essentials. Underwater lighting contributes to effects in pageantry and to spectator interest, and may in time become a prescribed feature of construction.

Doubtless one of the most forward-looking ideas is found in the pool of Wellesley College Recreation Building, opened in March, 1939. An observation window is so placed that a swimmer may be watched as she swims on the surface, dives from the one- or three-meter board, and makes a racing turn. This is located in the side wall of the pool below water level and is used for instructional and photographic purposes, making possible much research in swimming. A telephone connects with the pool deck and with the instructor's office, so that an observer may quickly call attention to the execution of a stroke or dive, thus increasing teaching technique. Underwater lighting is also provided.

Proper filtration, re-circulation, daily chemical analysis of water, acceptable practices in cleaning, sterilizing footbaths, observance of local and state health regulations, proper routing of students from dressing rooms to pool, lifeguard service, should be essentials in its operation. All mechanical structures should be easily accessible for inspection and repair.

Because all participants in outdoor and indoor activities will use dressing, locker, and shower rooms, these areas play an important rôle in the welfare of students. They should be above or as close to ground level as possible, and should have good light and ventilation. Locker arrangements may be the basket type or the individual stationary type with dressing areas adapted to the particular system. Shower rooms should be separate, and so constructed that moisture is confined therein, rather than penetrating into the dressing areas. Oberlin College and Wellesley College have provided a drying room between showers and dressing compartments for this purpose. Group showers are increasing in favor, with a limited number of individual shower booths available. Hair dryers should be numerous and readily accessible. Footbaths containing a sterilizing solution should be in the entrance to the showers.

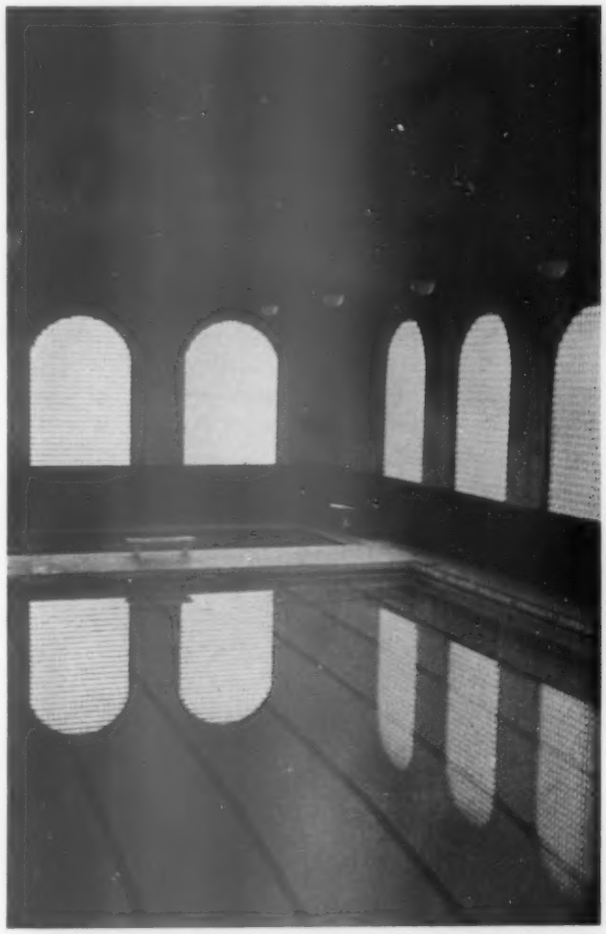


Fig. 12—The two halves of the Crane pool at Oberlin College

The need of adult recreation has been recognized for many years and has been fostered by clubs, community centers, and various organizations. Thus, in greater numbers college faculty have been taking advantage of their institutional facilities. Consequently, a new building should provide dressing facilities for the women of the administrative and general teaching staff and faculty wives. Since co-recreation is one of the forward-looking aspects of a modern program, men faculty and men guests should have

dressing rooms and showers set apart for their use. Public lavatories and toilets for both men and women should be located near areas to which the public commonly have access.

If daily use verifies scientific research, Hales Memorial may set the standard for shower room flooring. Upon recommendation of Mellon Institute of Industrial Research, University of Pittsburgh, a copper-treated tiling set with copper-treated cement has been used. By experiment, this kills various bacteria, especially the fungae causing "athlete's foot"; this destructive action does not seem to diminish by constant use. If this newly devised material proves as effective as tests indicate, it may be the future flooring for all dressing facilities.

In some colleges the pool is such an entity that it is desirable to have separate showers and dressing areas within its limits. This has been found practical at Oberlin College, Wellesley College, and Vassar College; also, at the University of California at Los Angeles and the University of Texas. In the last two institutions the wet-dry system is employed, by which a student enters an aisle leading to her dressing booth and shower; after donning her suit, she emerges by an aisle that leads only to the pool, thus confining the tracking of water to one aisle and the use of street shoes to the other. Toilets should be located en route to the pool, and in other areas according to the general plan of dressing facilities.

Towels for all participants and swim suits of cotton fabric should have adequate storage space and should be laundered and sterilized after each use. These should be issued under the supervision of an intelligent, refined, firm matron, who can add much to the spirit of right care and pleasure in the use of equipment provided by the institution.

Miscellaneous Facilities

In many colleges offering professional courses in physical education, it is advisable to include a departmental library, classrooms, and physiological laboratories. These are often convenient to, or located in, the administrative unit. (Illustration No. 13.)

Classified under miscellaneous facilities may be a rest room located in a quiet area and equipped with cots. This should serve commuters or any student seeking a quiet, detached place for an hour's rest, but except in emergency not the ill student, who should be cared for by the Health Service. An Athletic Association Board room, facilitating and stimulating the work of that organization, should be as centrally located as possible. A dark-room with necessary equipment should be furnished for the development of posture photographs and for pictures taken to help increase correct techniques of performance and teaching. Storage rooms for game equipment, with closets or cases constructed for specific game materials, should be located in respect to the specific courts upon which the equipment will be used

Outdoor Courts and Fields

If the administration plans wisely, there should be outdoor courts for various activities that cover areas many times the space occupied by the building. Just as the science department needs certain types of laboratories and equipment for its various phases, such as anatomy, botany, biology, chemistry, physics, physiology, so do the various activities comprising the modern physical education program need their special areas and equipment.

The size of courts or fields for definite sports and the number playing on a designated team are estab-

Fig. 13

The departmental library in the Hearst Memorial Gymnasium at the University of California

lished by organized rules, so that a college of 200 will need the same sized hockey field as will a college of 2,000. The number of fields needs to be increased for the latter. If only one large field is available, it should be at least 150 x 300 feet, turf surface, on which there may be an interchange of hockey, lacrosse, soccer, speedball. Since tennis is the favored sport during and after college years, a battery of courts should be provided. The surface should be adapted to climatic conditions, and ordinarily should not be used for other purposes. An archery range should be set up on an unrestricted area at least 200 feet long, but space is economized and arrows are safeguarded by a grass backstop. A natural slope, as at Smith College, commends itself, especially since the range is so accessible to Scott Gymnasium (Illustration No. 14).

Softball requires its specific space, and in some colleges it is practical to have outdoor basketball courts. For both badminton and deck tennis, grass courts, 22 x 44 feet, may be located in various parts of a campus especially convenient to resident halls. With the net in place, and a deck tennis ring hanging on the net post, two or four students could find vigorous and satisfying activity readily accessible within a limited space.

For a college fortunate enough to possess a waterway within or near the campus, canoes, rowboats, and four-oared shells are practical. Some colleges provide one or more putting greens and a practice fairway for golf. To stimulate hiking, over-night camping, and week-end trips, outdoor cabins are becoming more and more a part of physical education facilities. These carry out the spirit of activities that may be highly useful in post-college years.

The maximum use of these areas should be the responsibility of the director of the department, by wise scheduling of classes and by limitation of class enrolment dependent upon the areas available and the number that can participate at a given time. Thus a soccer field could accommodate a class of 22 (or 44 by alternating play); five tennis courts would be needed for the same class if continuous instruction and play were available; four or five targets on the archery range would be satisfactory for that number. In such a manner, over sixty students could receive instruction in three widely diversified sports in three different locations. That number could be multiplied many times according to the duplication of areas and the extent of facilities.

The Problem of Finance

The problem of financial outlay has definitely been omitted, since that is based on such different factors,

Fig. 14—Archery range at Smith College

the size of the student body being a major consideration. In addition, one college may have a uniform building material for external harmony on its campus; another college may find a specific building stone to be a natural product within a reasonable distance. One college may be in such a geographical situation that waterproof foundation must claim an unseen but very essential percentage of cost; another may be on such high ground that such construction would not need consideration. One college may be so situated that it enjoys a long fall and spring season, so that emphasis would be placed on outdoor sports for which more areas would be needed; another college may have reverse conditions of climate. Since labor costs vary greatly about the country, one college may wish to use Federal subsidy; another college may not desire that assistance. The total expenditure is so much a matter of the needs and resources of the individual college that it would seem feasible to suggest a basic pattern without mention of financial outlay.

Doubtless at the present time there is no college without some of the facilities which have been discussed; a program has been evolved slowly, and available resources have been employed. However, when we consider the increase in both indoor and outdoor activities within the past ten years, we may well ask to what proportions will this member of the educational family grow.

The administrator may consider the suggestions given herein too utopian, but that should not prevent the establishment of a goal toward which the college may strive. Keeping in mind the true function of physical education for college women; keeping abreast of the program that contributes to that function; anticipating future growth by reserving areas adjacent to those already in use, he may find satisfaction in knowing that the expansion in years to come will be the result of a forward-looking policy.

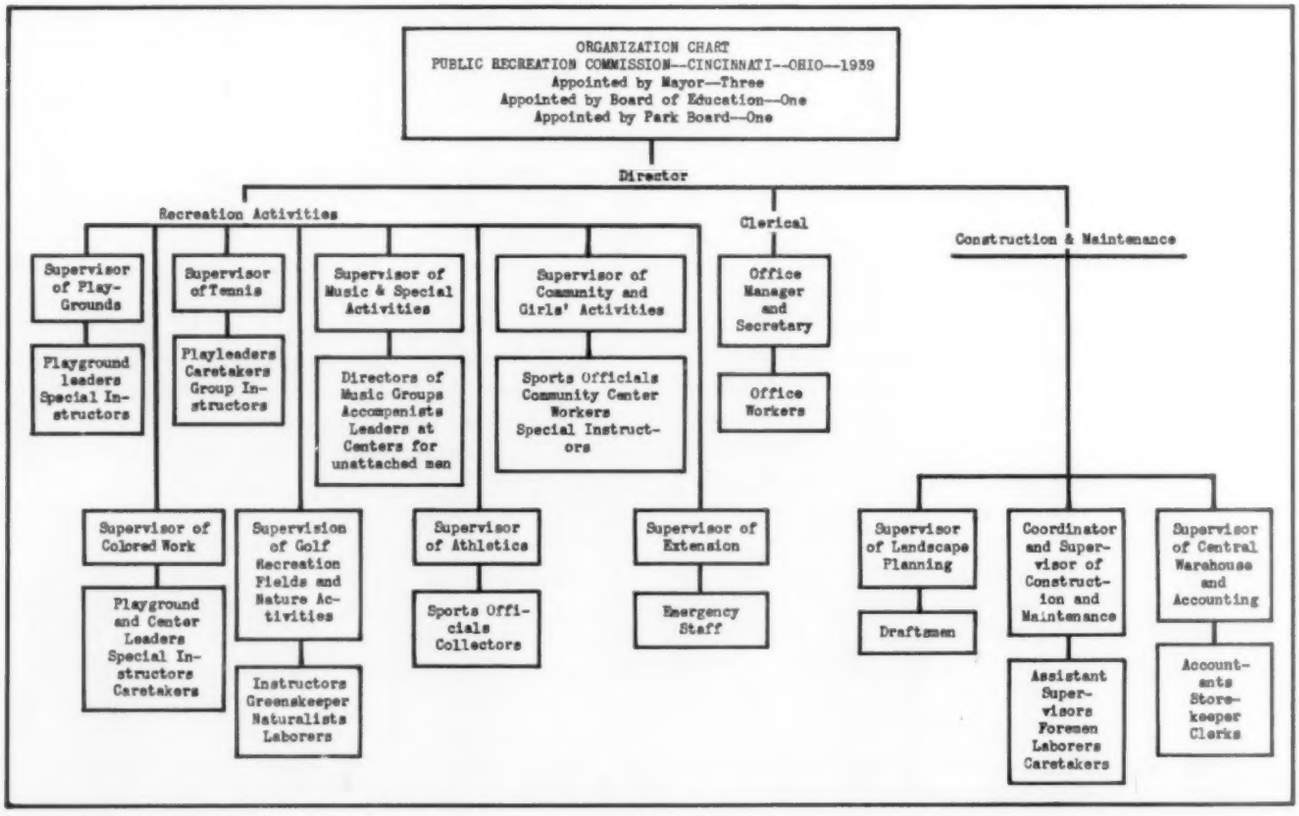
THE COOPERATIVE ORGANIZATION OF RECREATION IN CINCINNATI

By CLAUDE V. COURTER

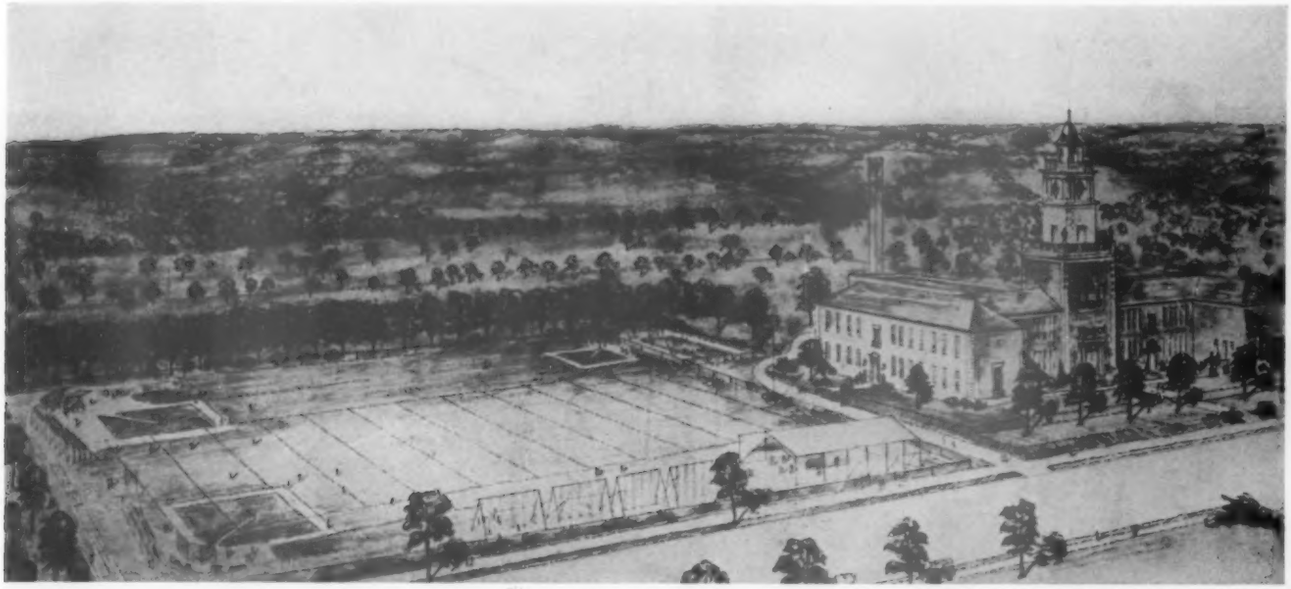
Superintendent of Schools, Cincinnati, Ohio

MOST American cities are faced today with the problem of more intelligent administration of the numerous and varied organized activities of community life. In practically every community each organized activity has come into being as its need has been felt, and it has developed independently as a separate and distinct enterprise. Thus the typical American city now budgets for and supports from taxes a board of education, a board of health, a park board, a library board, a recreation board, a child welfare board, and generally several other boards; and from private subscription or community-wide memberships it finances such organizations as the Community Chest with its many agencies, the Chamber of Commerce, museums, and various cultural organizations for the spread and development of music, art, dramatics, and sometimes even handicrafts. Each of these organizations has its own identity and its own program which it is the business of its board to maintain and to strengthen.

Because of the individual independence of these numerous public and semi-public boards, it is natural that at times some board will find itself in conflict and dispute with another board, and that now and then rivalries or duplication of services and activities will develop. It is not surprising that in some instances there is lack of coordination and sometimes even lack of cooperation among boards. It would seem, then, that progress in the administration of these many organized activities would point toward the gradual merging of some of these boards into a single board charged with the supervision of a larger area of activities. There are evidences that such a trend is under way.


ORGANIZATION CHART
PUBLIC RECREATION COMMISSION--CINCINNATI--OHIO--1939
Appointed by Mayor--Three
Appointed by Board of Education--One
Appointed by Park Board--One
Director
Recreation Activities
Clerical
Construction & Maintenance
Supervisor of Play-Grounds
Playground leaders Special Instructors
Supervisor of Tennis
Playleaders Caretakers Group Instructors
Supervisor of Music & Special Activities
Directors of Music Groups Accompanists Leaders at Centers for unattached men
Supervisor of Community and Girls' Activities
Sports Officials Community Center Workers Special Instructors
Office Manager and Secretary
Office Workers
Supervisor of Colored Work
Playground and Center Leaders Special Instructors Caretakers
Supervision of Golf Recreation Fields and Nature Activities
Instructors Greenskeeper Naturalists Laborers
Supervisor of Athletics
Sports Officials Collectors
Supervisor of Extension
Emergency Staff
Supervisor of Landscape Planning
Draftsmen
Coordinator and Supervisor of Construction and Maintenance
Assistant Supervisors Foremen Laborers Caretakers
Supervisor of Central Warehouse and Accounting
Accountants Storekeeper Clerks

Three agencies cooperate fully with each other in carrying forward a well-rounded and unified program of public recreation



Sayler Park Playground, adjoining Sayler Park School, 3.2 acres leased and improved by the Public Recreation Commission. Present plans provide for acquisition of an area of 10 acres or more adjoining to be added within the next year, purchase now under way

Interlocking Board Memberships

In the long interim that will be required for such a development in the administration of community activities, the intermediate step is the setting-up of interlocking board memberships. When some board members serve on two boards which have related functions, better understanding, greater cooperation, less duplication of program and less competition and rivalry between these boards may reasonably be expected to result. Such interlocking directorates are now not uncommon. In fact, in some communities they represent an established technique of administration.

It is through the application of this technique of administration that the development of recreation in the city of Cincinnati in recent years has become significant. Three agencies cooperate fully with each other in carrying forward a well-rounded and unified program of public recreation. These are the Park Board, the Board of Education, and the Recreation Commission. The Recreation Commission consists of five members. Three of these are appointed by the mayor of the city and thus are directly representative of the City Council. The other two members are one each from the Park Board and the Board of Education. On this board, then, are representatives of the three agencies which have some measure of responsibility for the provision of recreational activities for the young and the old in the city.

Because these three agencies are intelligently pulling together, a rapidly developing program of recreation is under way. It would be false to assume that an extensive and effective program of recreation is the direct result of the form of organization of the Recreation Commission. The form and structure of an organization is important because the structure makes possible activities that would otherwise not be possible, but whether or not intelligent activities take place is determined by other important factors, namely: the breadth of vision and quality of spirit of the men who head the organization. In the final analysis this will determine the quality of cooperation among governing boards in the planning and carrying forward of a unified program. There is a measure for everything. The measure of the general quality and effectiveness of the administration of recreation under the plan in operation in Cincinnati is to be found in the results that are being obtained.

These results may be classified under three headings: (1) the economical development of facilities; (2) the clear-cut discharge of functions; and (3) the total quantity and extent of recreational activities that result. In many cities the board of education carries on a program of recreation and develops its own school grounds, which are used for play and recreation by the children of the school and the parents in the community. At the same time a board of recreation conducts the program of recreation for the city administration. It develops play fields and facilities independently of the board of education, sometimes even paralleling the school facilities. To this can be added in some cities the development of recreational facilities by a third body—the park board—on and in connection with park properties.

Hartwell Playfield, a 12-acre playground and playfield, created on county property by the Recreation Commission, adjoining the Hartwell High School and Elementary School, for the express purpose of providing abundantly for the school requirements while at the same time taking care of the community needs

Economical Development of Facilities

This two-way or three-way development of recreation is not taking place in Cincinnati. It has become a policy for the Recreation Commission to develop its facilities in conjunction with, or adjacent to, properties and facilities of the Board of Education. It has become a policy for the Board of Education and the Park Board to plan developments in conjunction and cooperation with the Recreation Commission. As a result, the following development has taken place. The Board of Education found itself with school grounds and play yards needing development, but with no funds available to provide the developments. The Recreation Commission had funds available for the development of facilities, but with limited areas on which to carry forward the developments. The two boards therefore pooled their interests. The Board of Education leased grounds adjacent to schools to the Recreation Commission for a nominal consideration, and the Recreation Commission then spent its funds to develop these grounds. As a result of this arrangement, there are now several large district play areas in operation which are available to the Board of Education and the school children without charge until 5 o'clock each school day, and which in turn are operated by the Recreation Commission for the benefit of the other people in the community in the evenings and for other than school days.

In the carrying-out of these arrangements, the Board of Education pays each year about 60 per cent of the cost of maintaining the facilities. Thus the Board of Education gets greatly improved facilities for its program, and the citizens receive the utmost in facilities available for their use at the minimum cost of providing these facilities. At the present time the Recreation Commission has under lease from the Board of Education large areas adjacent to four high schools and eight elementary schools. In general, the same principle is operative in the use by the Recreation Commission of some 55 school buildings that are operated by the Recreation Commission as community centers.

The Function of Each Body

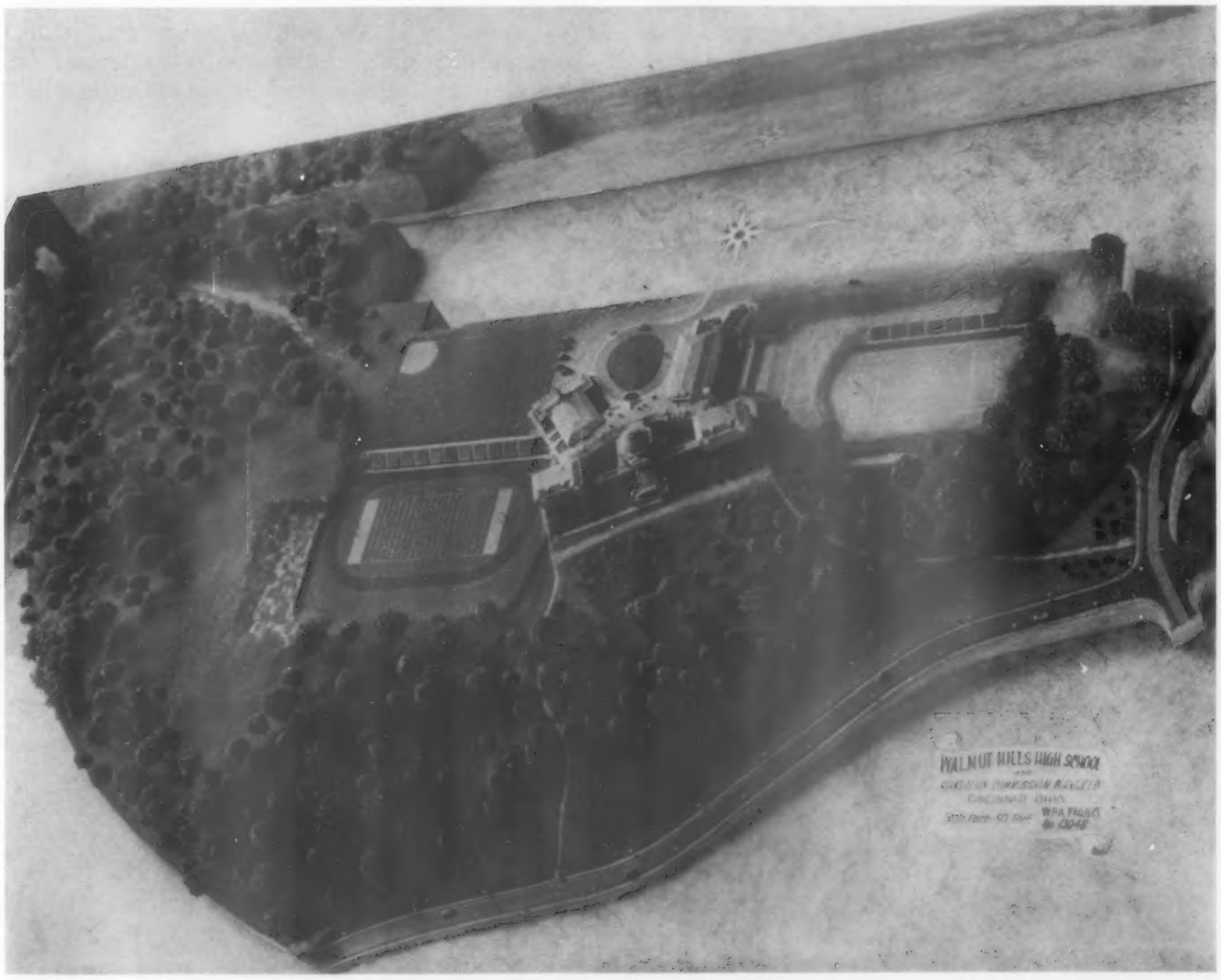
As a result of the arrangements that have been described, there has come into being an increasingly clear-cut recognition by the Recreation Commission, the Board of Education and the Park Board of the functions that each is to discharge. The school system concerns itself with the development of an increasingly large program of intra-mural activities among the school children, with the development in youth of an interest in recreational and leisure-time activities, and the ability and desire to participate.

The school teaches the ways, the rules, and the proper spirit of participation and is permitted to provide with some degree of adequacy for the preparation of the future citizen for intelligent and safe use of his leisure. The Recreation Commission in turn helps the personnel of the Board of Education in every way possible in the discharge of this function, but assumes as well responsibility for the development of a far-flung program of recreational and leisure-time activities for the adults of the community and for the youth of the community outside of school days and school hours. The Park Board in turn, in cooperation with the Recreation Commission and the Board of Education, and with a good understanding and conception of what each of these bodies is attempting to do, carries on its program of park development for a maximum of enjoyment and use by all residents of the community. There is no overlapping of activity among these respective organizations, and each in turn buttresses and attempts to strengthen the program of the other.

Organized Activities

The third measure of the effectiveness of this program of organization of recreational activities under the Recreation Commission is found in the quantity and extent of recreational activities reported:

The Commission came into being in Cincinnati in 1927. At that time the city operated 24 playgrounds, 8 indoor pools, and 10 play streets, a total of 42 units for service to children under 16 during the summer months. Nine years later, in 1936, the city operated 69 playgrounds, 8 indoor pools, and 12 play streets, a total of 89 units, and a year later, in 1937, added 15 new playgrounds. The summer of 1938 found 42 developed playgrounds for children in operation. In addition to this, by 1937 five district play fields had been created in cooperation with



Walnut Hills Playfield, under the control of the Public Recreation Commission, adjoining Walnut Hills High School. Total Recreation Commission-Board of Education-Park Board area, 60 acres. Of this, 16 acres of the school land has been leased by the Recreation Commission, which has made a $100,000 improvement on it. An additional 20 acres, recently purchased by the Recreation Commission adjoining the 16 acres, is now under construction

the Board of Education. Some $500,000 has been expended by the Recreation Commission for the development of these five district play areas, which might be called the school-city recreation plant. Under this cooperative plan, two tennis courts adjoining public schools have been increased to 29 tennis courts adjoining five high schools; one quarter-mile track has been increased to three tracks; where there were no hockey fields, there are now five. Five thousand boys and girls were given instruction in tennis in 1937, and 4,000 were instructed in golf.

Increase in Facilities

These numbers have increased since that year. Sixty-four baseball diamonds in the city have been increased to 150, and 338 acres of land under the control and direction of the Recreation Commission have been increased to 1,100 acres. In the past few years many miles of fencing have been built; seating for spectators has increased from 11,000 to 33,000; the total number of tennis courts has increased from 50 to 150. Seven hundred seventy-five teams of boys have been organized into a Knothold League; 450 adult teams have been organized for softball; 50 for hardball; 58 for volleyball, and 82 for basketball, with a total attendance of more than 2,000,000 spectators for these contests. These are sample figures of what has taken place in practically every field of sport and recreational activity. The value of the land owned, leased and developed by the Recreation Commission since its inception is estimated at 8½ million dollars. The total recorded patronage of recreation activities for the year 1938 is quoted by the Commission as 4,455,069 in all activities. The report for 1939 will show further increases in these figures.

Recreation, under the arrangements and relationships among the boards of the city that share this function, has been developing with extreme rapidity in Cincinnati in recent years. All interests are satisfied that in Cincinnati, for the present time at least, the best plan has been found. Such problems as exist are those of personnel and personalities, with a steadily developing and increasing morale and a steadily developing and improving spirit of cooperation and good-will. The public is being served in increasingly large numbers; the taxpayers' money is being conserved. Cooperation in recreation in Cincinnati pays.

COMMON ERRORS IN PLANNING, CONSTRUCTION, OPERATION, USE AND ADMINISTRATION OF SWIMMING POOLS

By FREDERICK W. LUEHRING

Professor of Physical Education, University of Pennsylvania

SWIMMING has long been appreciated as a highly desirable developmental, recreational and safety activity. Over 2,000 years ago Plato stated that inability to swim was evidence of illiteracy quite as well as inability to read. Recently in various national and local curricular studies in health and physical education, swimming activities have been rated as surpassing all other sports and games in desirable outcomes, and many schools, colleges, and universities require their students to pass a swimming test before graduation. Notwithstanding this, however, even a casual survey in almost any community will reveal that the demand for swimming facilities far exceeds the supply of safe and adequate means available.

Water, in its natural state, though covering most of the earth's surface, is not well adapted to human needs in swimming activities. With the growing demand for more swimming facilities near home, careful thinking and planning have been necessary to make adequate provision for health, safety, location, area, depth, and temperature. Consequently, there arises the need for artificial swimming pools which are planned, constructed, and managed to meet these various requirements. There is a widespread need for more and better pools—not bathing pools, but swimming pools which are artistic, beautiful, healthful, and functionally adequate for appropriate educational and recreational ends.

Faulty swimming pools are amazingly common. According to the magazine *Fortune* for June, 1934, there were then over 8,000 swimming pools in the United States, and many more have been built in the subsequent five years. However, after viewing the good and bad features of a random selection of these pools in schools, colleges, and universities, in Y.M.C.A.'s and Y.W.C.A.'s, in athletic clubs and hotels, and in the areas of commercial, municipal, or private pools, the writer is convinced that the ideal or near-ideal pool is extremely rare. This seems more surprising when it is realized that human experience in building, using, and managing pools as facilities for swimming, bathing, and therapeutics dates back at least 5,000 years.

It would seem that humanity might have profited more from its centuries of experience in swimming pool activities by perpetuating that which is beneficial and avoiding the erroneous and the harmful. Clearly, today we are still building and operating too many pools according to medieval standards; and too many of these are being used by a horde of persons having antediluvian ideas about pool use, and willing and even determined to use the pool without first having had a thorough cleansing bath.

The rules and regulations of state and local boards of health, and state laws relative to the swimming pool and its sanitation, give further indirect evidence of shortcomings to be avoided. They apply largely to the correction of errors in pool building, use, or management. The character, extent, and development of these rules and regulations also indicate need for education and understanding instead of more legal prohibition, coercion, and penalties.

Faulty swimming pools represent avoidable mistakes, mismanagement, and waste of funds. The errors once made are often irremediable or prohibitively expensive of correction. Even more important, many of these mistakes continue to endanger and frustrate the play life of pool users for generations. Literature on the subject * and personal visits to swimming facilities should convince any open-minded observer of the prevalence of shortcomings.

Undesirable swimming pool experience may arise in any or all of the various aspects of the pool, namely, its planning, construction, operation, use, administration or management. Some, but by no means all, of the more common errors to be avoided in the areas mentioned are herewith listed and briefly discussed.

Errors Frequently Found

1. *Faulty terminology: (a) referring to pool users as bathers instead of swimmers, and (b) referring to the pool as a bath or bathing place, or cleansing agency.*—The literature abounds in this error and favors a tendency for erroneous terminology to imply corresponding functions. Bathing and cleansing are vitally important *before* admission to the pool. A pool used for the joint function of bathing and cleansing as well as swimming soon becomes a nuisance and a health hazard, and the practice should be prohibited.

* "Swimming Pool Standards," by Frederick W. Luehring, Ph.D. xii + 273 pp. $5.00. A. S. Barnes & Co., New York, 1939.
"The New Y. M. C. A. Aquatic Program." 104 pp. Association Press, New York. 1938.

2. *Planning a pool by copying another.*—In copying pools believed to be satisfactory, or commonly said to be so, an amazing number of mistakes have been perpetuated. The practice is very common, unfortunate, and expensive.

3. *Assigning the job of planning a pool to an architect without first giving him a carefully prepared statement of the educational needs and specifications to be served by the pool.*—Architects, although technically well qualified in the designing of buildings, selection of materials, and supervision of construction, have usually but little acquaintance with the detailed educational needs which the pool should serve.

4. *Fill-and-draw, or flowing-through pools.*—These types of pools are no longer considered satisfactory even when they are emptied, scrubbed, and filled daily and although thorough cleansing baths are required of pool users before entrance. Such pools are common in many cities and are still being built in summer camps and recreation centers.

The city of Philadelphia had a number of the first pools built in this country; and its most famous citizen, Benjamin Franklin, was America's first author of a treatise on the sport, and our first swimmer to win international attention. Yet this great city does not have a single swimming pool in its public schools, and most of its children, in their strong and natural desire to swim, continue to crowd into some thirty antiquated municipal pools of the fill-and-draw type. In contrast, Chicago, Detroit, Rochester, Pittsburgh, and New York City have provided extensive swimming pools in their public schools. New York City, too, is rapidly replacing its old fill-and-draw pools with large, up-to-date outdoor pools of the approved recirculation type with continuous refiltration and disinfection of the water. Some fifteen of these are being built this year, and three more are in the planning stage.

5. *Basement location.*—This is one of the most serious errors. Many pools are located in dark basements with little or no natural light. A swimming pool still in use in one of the large cities of Ohio is located in the basement and in the very center of the building, so that there is no outside light possible for it. Many schools, colleges and universities, and Y.M.C.A.'s have made this error of basement location, which tends to be perpetuated with the wide practice of patterning one pool after another. Once made, this error cannot be corrected until a new pool is built.

6. *Odd-size pools.*—Pools of odd size are still too frequent. In general, they cost just as much as pools with provision for standard distances. This shortcoming is especially characteristic of outdoor pools. Swimming pools with standard provision for sectional, national and international competitive swimming meets are far more common in a number of European countries than in the United States, and many more are needed.

7. *Pool length three times its width, or pool width one-third its length.*—This faulty specification widely recommended in the literature is about as erroneous and unreliable as the saying that a drowning person goes down for the third time before being lost, which many people still believe. There is absolutely no functional or educational reason for the specification.

8. *Too narrow width.*—A great many pools in schools, colleges and Y.M.C.A.'s have been built only 20 or 25 feet in width. Any pool width under 28 feet is likely to invite dangerous collisions among swimmers, and between divers and the side walls, because the necessary space requirements for these activities are inadequate especially as to minimal area for diving and minimal number and width of swimmers' lanes.

9. *Failure to provide a deep area adequate for the needs of diving.*—It is now more common to provide for beginners in swimming, but similar provision for beginners or advanced groups in diving is often overlooked or only partially made.

10. *Building a pool with a so-called spoon-shaped bottom.*—This extremely common error is no doubt based partly on the desire to save expense in construction, and in the amount of water used. The spoon-shaped bottom is functionally faulty for the needs and activities of pool users, expecially in diving. Approximately one-third of the dives of the standard diving table lead the swimmer to enter the water under the diving board, or near it, thereby inviting collision with the upward-sloping bottom.

11. *Slippery pool walls, especially at the points or areas used in making turns at the ends and sides of the pool.*—Ends and sides of the pool are utilized a great deal for turning and pushing off, a necessary pool activity for efficient swimming. Slippery sides or ends here present unnecessary discouraging obstacles to the practice and learning of pool users.

12. *Confusing swimmers' lanes and lines.*—Many mistakes have been made in locating the lines on the bottom of the pool. In competitions, the swimmer swims in a 7-foot lane, now specified by rule. In best practice, lanes for competitive swimming are located on the surface of the water. In free style or breast stroke races, the swimmer takes his direction by swimming over a line located on the bottom of the pool and in the center of his surface lane. Placing the guiding lines at the sides of the lane is incorrect and tends to make the contestant swim a zigzag course which may result in collision with other swimmers in the contest.

13. *Lanes too narrow.*—The literature on the swimming pool carries numerous suggestions indicating that swimmers' lanes should be 5 feet wide and that the pool width should be in multiples of 5 feet. This designation is no longer valid. With the addition of the breast and back strokes to the program of events in swimming meets, the width of swimmers' lanes has been increased to 7 feet, by official action of national swimming rules committees.

14. *Open or "rollout" type of overflow gutter.*—In recent years the open type of gutter has been frequently installed instead of the recessed type. This has been especially common in Y.M.C.A. and outdoor installations. Its chief advantages are comparatively lower cost of installation, and ease of cleaning. However, in the judgment of the writer, the recessed type is more sanitary and less hazardous to pool users.

15. *Pool deck or walkways too narrow, or not completely surrounding the pool.*—To appraise the need for, and adequacy of, a pool deck, it is desirable to consider the appropriate function of such surrounding area. This area is frequently called the runways, a less desirable term, because running is dangerous here and should not be permitted. When wet, the deck may be somewhat slippery, even though it is constructed of the best non-slip materials.

The deck should serve as an indispensable activity and teaching area to serve various and different needs at the ends and sides of the pool. There are still survivals to be seen of the malfunctional and unsanitary practice of locating showers and toilets on the pool deck.

16. *Steps and ladders placed at the end of the pool, or steps and ladders projecting into the pool at either the ends or the sides.*—These locations are dangerous to the safety of pool users. Properly designed and appropriately placed means of entering and leaving the pool are now available.

17. *Slippery surfaces on the deck or walk areas immediately surrounding the pool.*—Recently in a prominent eastern university marble slabs were used for the pool deck, perpetuating the error made by the same institution in another pool built thirty years earlier. As a consequence, many unnecessary and serious accidents have been sustained in spite of constant watchfulness.

18. *Ceiling too low for safe and efficient diving.*—Basement pools are notoriously deficient in ceiling height. This error, however, is not confined to basement pools. Recently a large southern university made the same mistake in its new pool, which is located above ground and excellent in nearly all other respects. Low ceilings are dangerous and discouraging for divers, because, with the aid of the springboard, the efficient diver often lifts his body several feet above the top of the normal level of the diving board. Collision with the ceiling or girders, or close proximity to these obstructions, retards learning, impairs diving, and may result in injury. A clearance of less than 12 feet above a diving board is dangerous.

19. *No office for the instructor or coach.*—Raycroft cited this deficiency in 1914. It is still too prevalent. An office is needed for the instructor as a place for conferences, study, rest, and the keeping of records.

20. *No gallery for spectators, or one too small, or one with poor sight lines, unnecessarily large blind areas, or obstructions.*—Swimming, diving and water games are highly interesting to observe and study. The pool gallery may be a valuable instructional and recreational area. A prominent university has a swimming pool gallery which, though large, is so poorly designed that only the first two rows of spectators are able to see all the swimmers in a race. Consequently, whenever a race is swum, most spectators jump to their feet and stand on the seats in an effort to see better, but with the inevitable result that their vision is relatively not improved.

21. *Unstandardized or unsafe diving depth or equipment.*—Inadequate pool depth for diving, poorly designed, unsafe, or improperly placed diving equipment, is still too often found. Excellent provision for the needs of divers speeds learning, reduces accidents, and increases satisfactions for learners and spectators.

22. *Condensation.*—There have been many failures to construct, operate and maintain the pool and its accessories so that condensation problems with annoying dripping on swimmers and spectators may be avoided. This difficulty can be obviated in part by proper design and construction of the plant, and in part by intelligent and careful correlation of the temperature of the pool room and the pool.

23. *No acoustical treatment for pool-room walls and ceiling.*—In many pool rooms the sides and ceilings cause annoying reverberation of conversation, announcements and other sounds, thus seriously hampering the instructional and learning process. Appropriate acoustical materials are available.

24. *Faulty arrangement or design, or an inadequate number of such personal service facilities as locker rooms, toilets, showers, footbaths, and drying rooms.*—Locating showers and toilets so that one must visit the latter after having used the showers, would be unsanitary. Having too few showers, or showers of poor design, may result in perfunctory cleansing of pool users. Likewise, cold and dark shower rooms favor uncleanness. The entire layout should be simple and direct, to avoid retracing of steps or cross traffic, and to favor the utmost in cleanliness. Showers

and toilets should never be located in the pool room.

25. *Delegating the care, supervision and operation of the recirculation system (including hair catcher, pumps, alum and soda-ash feeders, filters and water heaters) to a janitor instead of to a trained and well-qualified technician.*—The recirculation system is a specialized and complicated mechanism for water renovation and purification that requires more than perfunctory attention. If any part of the system is impaired, the health and comfort of pool users are likely to suffer.

26. *Permitting swimmers to use the pool without having capable and ever-watchful instructors or lifeguards constantly on hand and responsible for health and safety.*—Such gross negligence should never be permitted. Unfortunately, drownings still occur in swimming pools as a result of inadequate supervision. The utmost provision for safety must be made for every minute that the pool is in use.

27. *Permitting persons to enter and use the pool without having had a recent thorough health and medical examination by a competent physician.*—This malpractice is widespread but is rarely mentioned in the literature. Its correction is important.

28. *Entering the pool room or the pool without having used the toilet and without thereafter having had a very thorough cleansing shower in the nude.*—The excretory regions of the body are frequently highly contaminating. The need for educating all pool users to cleanse themselves very thoroughly before entering the pool room or the pool is of the greatest importance. All violators should be excluded promptly and, if need be, permanently.

29. *Allowing persons to use the pool without having been carefully inspected for cleanliness, illness and communicable diseases.*—Inspection for health and cleanliness is still too perfunctory, or omitted entirely. Better education and unfailing inspection are continually necessary.

30. *Prolonged or competitive underwater swimming.*—A persistent underwater swimmer driven on by a desire to surpass the subsurface achievements of another, or a swimmer with a heart lesion, may easily pass into a form of unconsciousness and, unless immediately rescued, may drown before he is discovered. Even if drawn from the water, he may die from asphyxiation unless capable and skillful resuscitation is promptly applied.

31. *Inadequate instructions to pool users.*—There is generally lacking a course of instruction for pool users setting forth adequately the true function of the swimming pool as a facility for health, physical education, and wholesome recreation, and giving the rules and procedures by means of which swimmers should fit themselves for the use, care, and appreciation of the pool.

THE NEW GYMNASIUM

AT THE UNIVERSITY OF NORTH CAROLINA

By R. A. FETZER and OLIVER K. CORNWELL

Department of Physical Education and Athletics, University of North Carolina

THE new gymnasium at the University of North Carolina was started in March, 1937, and finished in April, 1938. Complete use of the building started in September, 1938. The building without equipment cost approximately $600,000 and was financed from three sources—Federal grant from the Works Progress Administration, state bond issue, and private gifts.

The University of North Carolina enrolment is 3,508 students—3,102 men, 406 women. Women students are allowed to enter at the beginning of the junior year. We have no physical education requirement for women, so our planning for women students consisted in making provision for various types of recreation.

The program for men is divided as follows: intercollegiate athletics—ten varsity squads, ten freshman squads; intramural athletics; required service courses for all freshmen; health instruction under joint control of the Department of Health Service and Physical Education; Division of Teacher Training; general recreation program.

The climate in central North Carolina is such that we are able to carry on out of doors about eight of the ten school months. Usually during January and February most of the program must be conducted inside.

The gymnasium is in the center of our facilities, which consist of ten intramural fields, forty-two tennis courts, two baseball diamonds, two practice football fields, one football stadium, one track stadium, and one building 120 x 300 with hardwood floor.

The site selected was large enough to take almost any type of building, on the side of a grade with a fall of about 30 per cent. About 4 feet underground was a stratum of rock, making it necessary to blast out about 6,000 cubic yards. The grade obviated considerable blasting.

The building has three general units—the Head House or main front wing, the Gymnasium wing, the pool.

The Head House

The Head House is 174 x 53 feet, three stories high, and is built, as is the remainder of the building, of brick and steel.

BASEMENT LEVEL

The basement or first floor of the Head House is on the same level as the main gymnasium floor.

There is a main corridor running the full length of the basement level, one end leading to the intramural fields, and the other end to the sun deck of the swimming pool. This corridor is 16 feet 8 inches wide with center stairways leading to the main lobby, and end stairways leading to the locker-room level.

On one side of the corridor is the main gymnasium, and on the other side:

(1) The general equipment, storage and stock room for physical education and athletics.—This stock room is 37 feet wide and 78 feet 7 inches long, with a service lobby 27 feet 9 inches x 16 feet. There is adequate shelving space and other necessary equipment for the storage and care of equipment.

(2) The master switchboards and thermostat controls.—All ventilation, air flow and heating temperatures are under direct control of these master switchboards. A flash lighting system is used to signal what units are in operation.

(3) One of the seven thermo-fan units.—This unit ventilates the entire Head House.

(4) Storage room, 55 feet 2 inches x 39 feet 7 inches.

LOBBY LEVEL

The control or main entrance to the building is from the north into a lobby 53 feet x 47 feet 8 inches. A corridor 12 feet wide extends the long way of the lobby floor. In the center are two descending staircases, and at the ends two ascending stairways. The floor is an 8-inch concrete slab covered with asphalt tile, and the walls are imitation travertine.

At the west end is a men's lounge 21 feet 5 inches x 20 feet, with a toilet room 20 feet x 15 feet.

Adjoining are the main offices for the athletic division. Four offices are included in this unit, with various types of equipment—vault, ticket grills to the main lobby, closet storage space, counters and the like.

Across the lobby is another ticket office 33 feet 10 inches x 6 feet 8 inches.

The ladies' lounge is 33 feet 10 inches x 19 feet 5 inches, with toilet room 29 feet 2 inches x 14 feet 5 inches.

The Monogram Club Room is 39 feet 3 inches x 18 feet 10 inches.

There is a small office 12 feet x 13 feet 7 inches.

THIRD FLOOR OR CLASSROOM AND OFFICE FLOOR

Two large classrooms 53 feet x 27 feet 3 inches, with adequate seating room for 112 students.

Two classrooms 32 feet 6 inches x 25 feet 5 inches, with adequate seating room for 56 students.

A corridor extending the length of the Head House 6 feet wide.

In the center of the Head House across the corridor is a combination library, seminar room and main physical education office 20 x 20.

On one side is one rather large office—13 x 20 and four smaller offices—8½ x 20.

The other side of the library is an exact duplicate, giving us two large offices, eight smaller offices, and one seminar-library room.

Main Gymnasium Unit

This unit over-all is 250 x 150 feet, built of brick and steel, and finished to a great extent in glazed tile, both floor and walls.

There are, in reality, three floor levels. The lowest floor level is for the purpose of giving a 20-foot ceiling or height to the back or first-floor unit.

FIRST-FLOOR UNIT

In this unit there are two small gymnasia 33 feet 2 inches x 48 feet 4 inches with 20-foot ceiling. Between the two rooms are four storage rooms occupying a space 20 x 20 feet. The first of the two gymnasia is equipped for individual physical education, and the second is equipped for boxing. There are maple floors and smooth walls in each.

At each end of this level is a staircase 17 feet 3 inches wide leading to the intramural fields and the main gymnasium-floor level.

A corridor 6 feet wide connects the two staircases, and at the same time a staircase at each end of the corridor leads to the locker-room level.

On the opposite side of the corridor are five handball, squash racquet courts 20 x 20 x 40, finished in smooth concrete plaster and with maple floors.

This first-floor level unit occupies a space 150 feet x 84 feet 11½ inches x 20 feet and has two heating and ventilating units that provide for this area.

LOCKER-ROOM FLOOR

The second-floor level or locker-room floor has three major corridors traversing the south, east and north sides. On ascending the staircases from the first floor level one approaches the south corridor.

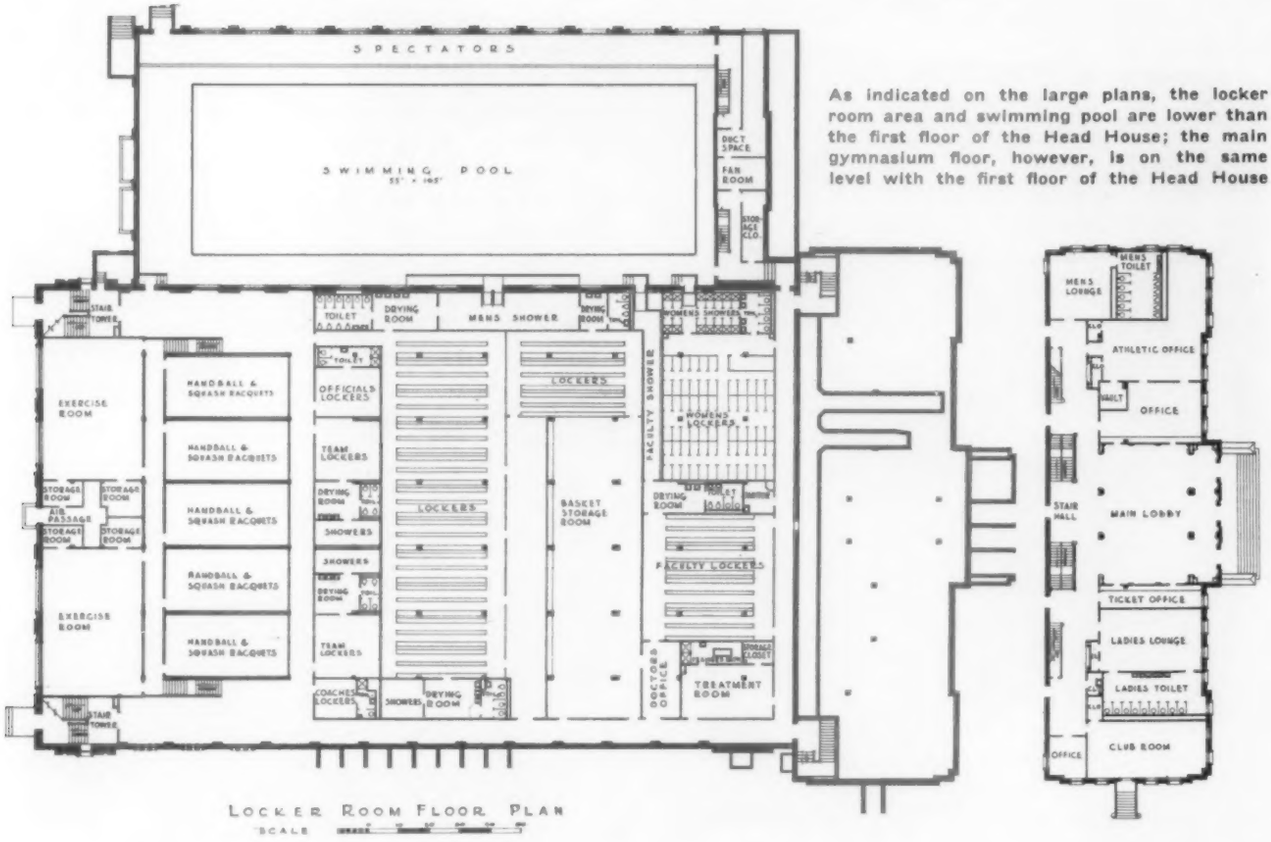
This floor level over-all is 165 feet x 150 feet with an over-all ceiling height of 11 feet. There is a dropped or artificial ceiling from the concrete slab, providing a ceiling air chamber of 16 inches. In this space the ventilation conduits are placed and all permanent locker equipment is tied in. Exhaust fans move the air from the room through the lockers and out through the air conduits.

The main gymnasium floor is supported by columns 1 foot 4 inches in center, and no partitions are used as supports. All partitions are made of tile glazed on both exposed sides. This provides tile walls and floors for the entire locker-room level.

On the south corridor are three team room suites, a small locker room, and shower and toilet facilities for officials.

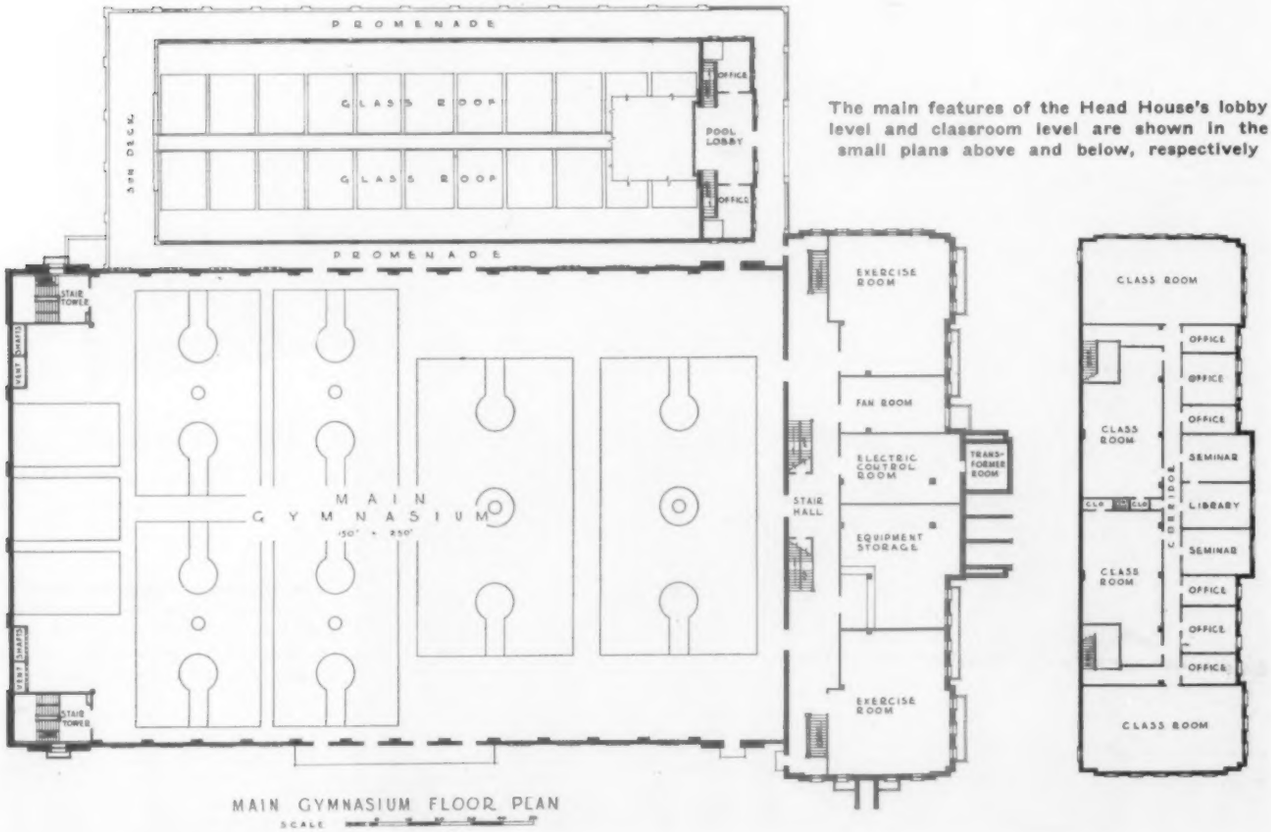
Each of the team room suites has a locker room 21 feet 2 inches x 21 feet 3½ inches, with adequate drying room, shower and toilet facilities. We are using these suites for various varsity and freshman squads, and expect to use them for varsity teams.

The main student locker and basket room is 85 feet 4 inches x 124 feet. At the east end are a shower, drying room and toilet facilities. Occupying a space 100 feet long and 42 feet 8 inches wide, 1,000 lockers have been installed in two tiers. These lockers are 42 inches x 15 inches x 18 inches and are mounted on a 4-inch tile-covered base. There are steel panels used to build the locker system as a whole directly into the ventilation system in the ceiling. At the west end of this unit is one large shower room, two drying rooms, and two toilet rooms. Entrance is through the drying rooms to the showers and thus to the swimming pool unit. At the northeast corner of this large room we have installed 131 lockers 76 x 15 x 18. They occupy a space 43 feet 4 inches x 27 feet 2 inches and are used for more or less seasonal permanent assignments.



LOCKER ROOM FLOOR PLAN
SCALE

As indicated on the large plans, the locker room area and swimming pool are lower than the first floor of the Head House; the main gymnasium floor, however, is on the same level with the first floor of the Head House



MAIN GYMNASIUM FLOOR PLAN
SCALE

The main features of the Head House's lobby level and classroom level are shown in the small plans above and below, respectively

Floors of the main lobby are of asphalt tile, walls of travertine. On each side of the lobby are ticket offices and booths

The faculty shower room. All plumbing is exposed. Floors are of glazed tile, walls to a height of 5 feet are of tile. Entrance to the pool is through a footbath at extreme end of pool

Photos above and at left by courtesy of Speakman Co.

The student shower room includes a battery of 36 showers completely finished in glazed tile. The room is conveniently located between the pool and the men's locker room

On one side of this corridor is the basket room, on the other side the general locker room

Three thousand individual baskets are stored in this room, and one is assigned permanently to each student using gymnasium facilities

Seating facilities on one side of the varsity basketball court. This section accommodates 2,800 spectators

The service lobby for the basket-locker system is 14 feet wide and 90 feet long. Using a shelved counter 90 feet long with a steel wire screen, the basket-equipment room is 90 feet long and 28 feet 8 inches wide. There is shelving and basket equipment for 3,000 students.

We are using a compulsory fee system for all students in school, and for this fee we are supplying all individual and game equipment, except shoes, used in the building, together with laundry.

The basket room is used as the equipment issue room for all activities with the exception of intercollegiate equipment.

On the corner of the east and north corridors is a suite of four rooms which include the resident doctor's office, training, treatment and first aid room, a room we are using for various types of pack baths, and a general supply room. This suite occupies a space 58 feet 10 inches x 28 feet 2 inches and can be entered from either the north or the east corridor.

The faculty locker room is 58 feet 10 inches x 42 feet 8 inches and has 360 lockers 42 inches x 15 inches x 18 inches. The shower room from this locker room enters directly into the pool. There are adequate shower, drying room and toilet facilities to take care of the locker space. We operate this on a membership fee basis.

The locker room for women is at the extreme northwest corner and can be entered without interfering with other parts of the building. These quarters are 63 feet x 58 feet 10 inches and contain 65 dressing booths and 4 double-tier lockers in each. The shower room connects directly with the swimming pool. It has individual shower and dressing booths, and adequate facilities in general are available.

The corridors in the north, east, and south sides are well lighted and adequate to care for the traffic.

MAIN GYMNASIUM

The main gymnasium is 250 feet x 150 feet over-all. At the southeast and southwest corners there is a space cut off, 26 feet 6 inches x 17 feet 3 inches, to provide stair towers. Adjoining this in the south wall are two ventilation units 20 feet x 4 feet. These are the only constructions of any type on the main floor.

The floor is set up as follows:

Two basketball courts 94 x 50.

Four basketball courts 65 x 40.

Three one-wall handball courts 18 x 34.

Superimposed on the two large courts are two tennis courts.

Superimposed on the four small courts are volley-ball and badminton courts.

Floor plates for all this equipment plus boxing ring, three horizontal bars, flying and traveling rings, tumbling mats, parallel bars and the like are used in certain areas.

The floor is a concrete slab 8 inches thick, and resting on this are sleepers or screeds 2 inches x 3 inches, 16 inches on center, a heavy paper layer, and then a ⅞-inch pine floor. The top layer is 25/32 Michigan maple. On this we have used, to date, the Hillyard finish.

The walls up 10 feet high are smooth glazed tile 5 inches x 12 inches, except the south wall, which is concrete plaster 20 feet high.

The battery of windows on the east and west sides are above the 10-foot level. Four doors or exits are in the exact center of the east and west sides. All entrance, however, is from the Head House on the north side.

The ceiling height is 24 feet, and the lighting consists of 132 500-watt units, or 66,000 watts, which gives 18 feet candlepower on the horizontal plane.

For intercollegiate contests we are using ramps from the Head House lobby level, and tunnels on the gymnasium floor level. These feed out on 28 rows of removable stands, which on the one side will seat 2,500 people. Other stands can be added around the floor.

The Swimming Pool Unit

The swimming pool unit over-all is 206 feet 10½ inches long x 82 feet 5 inches wide. At the front or north side is the two-story Head House 82 feet 5 inches wide and 17 feet deep. On the upper level are two offices, one on each side, 12 feet 3 inches x 17 feet. In the center is a lobby 48 feet 5 inches x 17 feet. At the pool end of the lobby is an open observatory 19 feet across, which is closed up 4 feet with a brass grill.

Two stairways descend to the pool deck level. The west stairway leads to the observation deck of the pool, which is 9 feet 3 inches wide and 187 feet 6 inches long and provides seating for 650 people.

The east stairway leads to the Head House of the gymnasium.

The first floor of the pool Head House provides space for the fan unit, storage space, and room for some equipment.

In the pool room the spectators' gallery is cut off from the pool by a 36-inch tile wall.

The pool deck on the west side is 6 feet 7½ inches wide; north side, 5 feet 9½ inches; east side, 9 feet 8½ inches; and south side, 16 feet 8½ inches.

The pool itself is 55 x 165 with a minimum depth of 3 feet and a maximum depth of 10 feet. The east deck is 22 inches lower than the locker and shower-room level, therefore the entrances for women and faculty have three steps, and the main men's student entrance has a ramp extending each way from the entrance. Built-in footbaths are located at each entrance. There is a skylight extending the full length

The swimming pool is 165 feet long, 55 feet wide, and boasts a 10-foot deck. Walls are tile to 4 feet height, and acoustical plaster is used above. The tank holds 385,000 gallons of water. The depth varies from 3 to 10 feet. Three one-meter and one three-meter diving-board are used

of the pool, and the west wall has a battery of eleven large windows. The room is tiled up 4 feet on the walls, and the remainder of the walls and the ceiling are finished with acoustical plaster. The ventilation system is built in the walls and ceiling, and the room heating system is built in the walls.

The pool is built into eight lanes, each lane being 6 feet 10½ inches wide.

The water is 3 feet deep at the shallow end; at 105 feet, 4½ feet deep; at 135 feet, 7 feet deep; and at 140 feet, 10 feet deep. There is 15 feet of deep water and then it slopes up to 7 feet at the 165-foot mark. The two sides slope up to 9 feet, making the water flow toward the deep outlets.

There are four 96-inch vertical pressure filters with 1,000-gallon capacity per minute; two coagulators, one for lump alum and one for lump soda, each with a capacity of 100 pounds; one 759-gallon pump per minute, and a supplementary pump of 250-gallon capacity per minute.

There are 34 2-inch scum gutter drains located on 12½-foot centers around the pool.

There are 24 3-inch inlets located around the pool, and three 6-inch outlets, one in the shallow and two in the deep end.

The heating tank has a capacity of heating 36,000 gallons of water per hour from 60 degrees to 80 degrees F.

This building houses the swimming pool

BENJAMIN ELECTRIC MFG. CO.

General Offices and Factory: Des Plaines (Chicago Suburb), Ill.

230–234 W. 17th Street
NEW YORK

20 N. Wacker Drive
CHICAGO

448 Bryant Street
SAN FRANCISCO

LIGHTING EQUIPMENT FOR OUTDOOR SPORT AND RECREATIONAL AREAS

Football Field

Football Field

Baseball Field

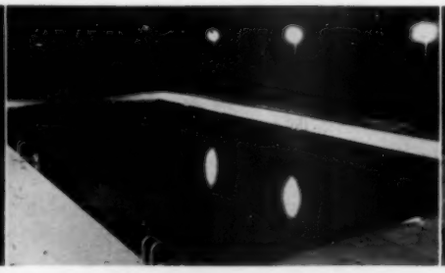
"Play-Area" Senior

"Ellipto-Lite" Play-Area

"Alzo-Lite" Long Range

Tennis Court Reflector

Softball Field



Outdoor Swimming Pool

Tennis Court

There is a suitable lighting unit in the Benjamin line to meet any lighting problem in the recreational field. Write for complete data on "Sports" Lighting.

FOOTBALL FIELDS

Benjamin "Play-Area" Senior Floodlights meet every requirement of football field lighting. They combine in one unit a large open-type porcelain enameled steel reflector with an inner auxiliary reflector of etched Alzak aluminum.

The porcelain enamel reflector is 28½ inches wide and 17½ inches deep; finished green porcelain enamel outside, reflecting white inside. All metal fittings are electro-plated.

Units are designed for use with 750-1500 watt lamps and are supplied with any one of the following brackets: cross arm, for standard 4¼ inch wood cross arms; cross arm with pipe clamp, for clamping around 1 to 2 inch iron pipe; slip fitter, to slip over the top of a 1½ or 2 inch iron pipe. Units are also available with a "Saflox" lowering attachment.

Benjamin "Ellipto-Lite" Play-Area Floodlights are also used extensively in football field lighting. They are of the same general construction as the "Play-Area" Senior (with the same choice of brackets) but are smaller in size and somewhat lower in price. For football fields, the 750-1500 watt size unit, with a reflector 21⅞ inches wide and 14¾ inches deep, is recommended.

In football fields where floodlights must be mounted 60 to 120 feet back from the sidelines behind the stands, the "Alzo-Lite" Long-Range Alzak Aluminum Floodlight is recommended. Supplied either with or without heat-resisting glass covers, they are 18¼ inches in diameter, take 750-1500 watt lamps, and are supplied with the same mounting brackets as "Play-Area" Units.

SOFTBALL, BASEBALL AND ATHLETIC FIELDS, PLAYGROUNDS, SWIMMING POOLS

In addition to their suitability for football field lighting, "Play-Area" Senior and "Ellipto-Lite" Floodlights have a wide application in lighting many types of outdoor sport areas such as baseball fields, softball fields, playgrounds, hockey rinks, swimming pools, stadia, etc.

TENNIS COURT LIGHTING

Benjamin "Tennis Court" reflectors are especially designed for the individual lighting requirements of tennis and provide exactly the distribution of light necessary for proper playing of this sport. Reflectors are etched Alzak aluminum and are available in either "Socket-Reflector" or patented Benjamin "Turnlox" types of construction. When used for certain locations on the court, reflectors are fitted with visors, as illustrated. Available for 750-1500 watt lamps only.

LIGHTING EQUIPMENT FOR GYMNASIUMS, LABORATORIES AND SHOPS

GYMNASIUMS, FIELD HOUSES, BASKETBALL COURTS

For effective glareless illumination of gymnasiums, field houses, basketball courts, indoor tracks and rinks, baseball cages, handball courts, etc., the Glassteel Diffuser is recommended. This unit provides the very finest quality of soft, well diffused illumination with a minimum of direct and reflected glare and consists of a porcelain enameled steel reflector in combination with an opal glass globe. The reflector has apertures in the top to allow approximately 11% of the light output to reach the ceiling to soften contrast, increase eye comfort and give the room a more cheerful appearance. Units are finished inside and outside in white porcelain enamel and are furnished with a choice of "socket reflector" separable fittings or "Turnlox" detachable hoods. "Turnlox" hoods allow the reflector, lamp and globe to be removed as a unit without disturbing the wiring. Units are supplied in sizes to accommodate lamps from 150 to 1000 watts.

When used in locations such as gymnasiums, field houses, handball courts, etc., a special heavy duty type of wire ceiling guard is used to protect the glass globe from damage in case of flying balls.

VOCATIONAL DEPARTMENTS

For the lighting of classrooms and buildings devoted to engineering and vocational pursuits such as wood and metal working, printing, automobile repairing and the like, a complete line of industrial lighting equipment is available. For general lighting in these locations the Glassteel Diffuser (described under gymnasiums above), the RLM Dome or the RLM "Silvered Bowl" Reflector Unit is recommended.

The RLM Dome Reflector is of porcelain enameled steel and provides good uniform illumination over flat and upright surfaces. It is finished white inside, green outside and is furnished in 60 to 1500 watt lamp sizes.

The RLM "Silvered Bowl" Diffuser combines in one unit the ideal qualities of both porcelain enamel and Alzak aluminum reflecting surfaces to efficiently utilize the distinctive indirect properties of 300-500 watt silvered bowl incandescent lamps. The result is soft, well diffused illumination, characterized by a minimum of direct or reflected glare. The reflector is of porcelain enameled steel, white inside and outside, while the Alzak aluminum inner reflector is etched.

LABORATORIES

The same lighting equipment recommended for vocational departments is suitable for laboratories where moisture, corrosive fumes and combustible vapors are absent. For laboratories where explosive hazards are present a complete line of Explosion Proof and Dust Tight equipment is available; where only moisture and non-combustible fumes are prevalent, "Vapolet" units, either with or without porcelain reflectors, meet requirements.

LIBRARY BOOK STACKS

For lighting book stacks in the library or shelves and bins in the store room, the "Stock-Bin-Lite" reflector is recommended. This unit provides a reflector of unique design in which uniformity of illumination from top to bottom of the shelf or book stack has been combined with careful shielding of the lamp to prevent glare when looking down the aisle. Reflectors are of porcelain enameled steel, white inside and outside, with a choice of four hood styles and come in 60, 75, 100 and 150 watt lamp sizes.

Indoor Basketball Court

Gymnasium

Field House

Glassteel Diffuser

RLM Silvered Bowl

RLM Dome Reflector

"Stock-Bin-Lite"

Laboratory

Library

Engineering Dept.

GENERAL ELECTRIC COMPANY

General Office: Schenectady, New York

SALES OFFICES AND DISTRIBUTORS IN PRINCIPAL CITIES

NOVALUX FLOODLIGHTING SERVICE

In the past few years the night floodlighting of high school and college athletic fields has increased to a surprising degree, owing to the popular interest in night sports, the added gate receipts, and the opportunities afforded for additional practice. Ask for Bulletin GE-A3218 on football field lighting.

How to floodlight play areas adequately as well as economically, is a problem deserving careful attention. Novalux Floodlighting Service offers the help of a large staff of experienced engineers and lighting specialists to help you obtain the best results at lowest possible cost. Novalux Floodlighting Service comprises:

1. Expert assistance with floodlighting problems at no cost
2. Sizes and types of floodlights suitable for all common applications
3. All floodlights scientifically designed for efficient performance
4. All floodlights manufactured from best quality materials for long life and low maintenance cost
5. Conveniently located sales offices, warehouses and service shops
6. Reasonable prices

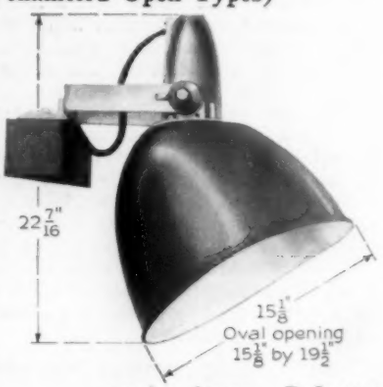
ESPECIALLY RECOMMENDED FOR SPORTS APPLICATIONS—Type L-68 (Alzak Processed Aluminum)

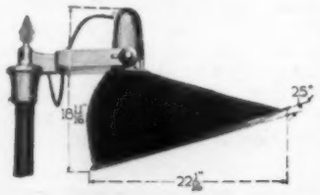
This 1500-watt floodlight is a simplified, low-cost type, but one that has a high efficiency that compares favorably with the most expensive floodlight obtainable. Several useful beam angles and a variety of mounting attachments make this light applicable to the majority of sports applications. It is light in weight, sturdy, and long-lived.

Type L-68, 1500-watt, enclosed, with crossarm bracket

FOR AREA LIGHTING—Types L-45 and L-46 (Porcelain-enameled Open Types)

These inexpensive floodlights are used mainly for lighting medium and large-sized ground areas from poles located in or near the area. For emphasizing small buildings or for greater range, auxiliary insert reflectors are available to build up beam candlepower. These floodlights are efficient, sturdy, and long-lived. Use 750-watt, 1000-watt or 1500-watt general service lamps. Reflectors are die-formed steel in two shapes illustrated, with glossy porcelain-enameled finish—dark green double-coated outside, white triple-coated inside. Type L-45 is here shown with crossarm bracket, and Type L-46 with slip-fitter mounting.

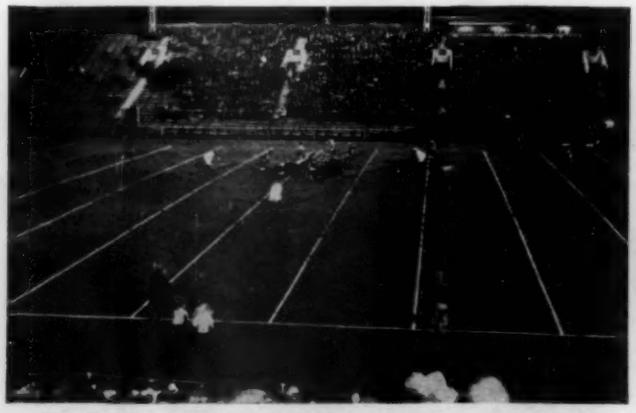




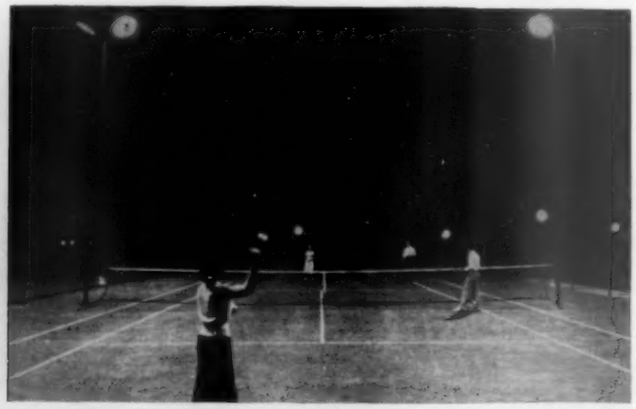
GENERAL PURPOSE FLOODLIGHT Type L-49

Type L-49 300/500-watt floodlight is a general-purpose floodlight suitable for general utility application. This floodlight, like the Type L-68, shown at the left, is made with its reflector spun from sheet aluminum, polished (specular) or etched (diffused) surface and Alzak processed.

Type L-49, 300/500-watt, enclosed, with base, swivel and stand



Floodlighting the football field provides increased attendance, bigger gate receipts, and additional practice time for teams



Floodlighting increases play-time for such sports as tennis, badminton and horseshoe pitching; putting practice on golf greens, skating, hockey, etc.

INEXPENSIVE GENERAL-UTILITY HANDY FLOODLIGHT—Type L-36 (Enclosed)

This simple, low-priced unit is suitable for portable or permanent outdoor installation. It is lightweight, sturdy, durable. The wide-beam aluminum-oxide reflector surface meets most requirements; and for a small additional cost, a selection of beam angles and longer life is obtained with an Alzak processed aluminum reflector.

Type L-36, 200-watt. Also Type L-35, 100-watt

A HIGH-QUALITY GENERAL-UTILITY FLOODLIGHT—Type L-29 (Shown at right, Copper-bronze construction, enclosed type)

Type L-29 is recommended for applications where considerable precision of light control is wanted, or where the severity of atmospheric conditions warrants the finest quality obtainable in order to obtain maximum life. This unit offers outstanding efficiency and unlimited life under exposure to weather.

Type L-29, 200/250-watt, with base and swivel-type mounting

Type L-38 (Cast Aluminum, Portable Enclosed Type)

This simple, sturdy floodlight has approximately the same illumination characteristics as the Type L-29; but having less refinement in details of construction, is offered at a lower price.

Type L-38, 200/250-watt; with portable base

HOW TO PLAN ATTRACTIVE ECONOMICAL FLOODLIGHTING

Floodlights are used for so many and such different purposes that it is practically impossible to reduce floodlighting applications to a few simple rules. However, the average installation involving relatively few floodlights can be designed easily, simply following the general principles and simplified method described on pages 5-7 of our Catalog GEA-1865C.

Large projects requiring many kilowatts of lighting deserve careful consideration by engineers of long experience. Likewise, projects that involve unusual lighting effects or special installation or operating conditions call for specialized experience. From our nearest sales office, you can obtain carefully planned recommendations for any project.

For floodlighting of outdoor sports, we recommend that prepared lighting plans which we will furnish upon request be followed as closely as possible.

SWIMMING POOL FLOODLIGHTING

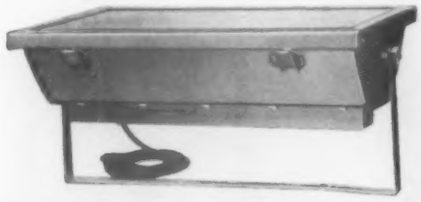
Underwater floodlighting in a swimming pool provides a novel and attractive appearance, as well as more safety for the swimmer.

Submersible floodlights installed in niches in the wall are well adapted for outdoor concrete pools and where installation cost must be kept at the minimum. Two sizes of floodlights are available for various size pools. The coiled flexible cable is encased in a rubber hose, making it possible to service the floodlight without disconnecting electric or drainage connections.

The dry-niche system, with the floodlight back of a porthole, is ideal for indoor brick- or tile-finish pools. The floodlights are serviced through a manhole in the rear of the unit. Further details will be furnished on request. Ask for Bulletin GEA-2909.

Type L-53 Fluorescent Floodlight (Aluminum, Enclosed Type)

This floodlight adopts the new fluorescent Mazda lamp to practical and economical floodlighting. Space requirements are small and energy consumption low—thus opening up new opportunities for the liberal use of colored light outdoors. The floodlight is efficient, durable, easy to install and operates inexpensively.



Type L-53 for 18 inch Fluorescent Lamp

Artistic floodlighting of buildings and monuments is often highly desirable—particularly if the spot illuminated is of historical interest

Underwater floodlighting of swimming pools increases attractiveness and provides an additional measure of safety for the swimmers

CROUSE-HINDS

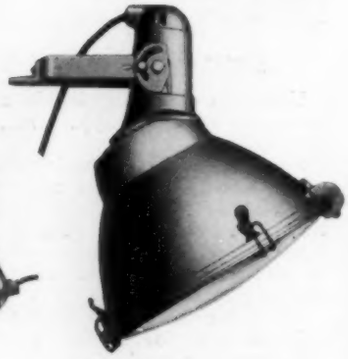
ESTABLISHED 1897

Syracuse, N. Y., U. S. A.

CROUSE-HINDS FLOODLIGHTS

For Night Sports

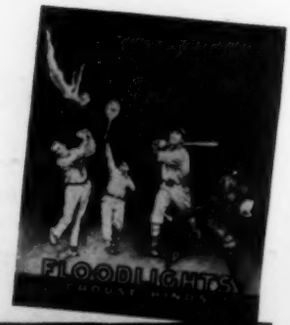
Floodlight tipped over for convenient servicing



Type MUA Alumalux

Type ADE-16

Bulletin 2299, entitled Nighttime is Playtime," describes in detail the applications of Crouse-Hinds floodlights to outdoor sports lighting. A copy will be sent on request.



Night sports have been increasing in popularity year after year. Almost every sport shows greater attendance at night than during the day, and floodlighting provides increased hours for indulgence in amateur sport and recreation.

Modern illumination has made night football a most satisfactory game for both players and spectators. Lighted practice fields permit adequate hours of practice which do not interfere with class schedules.

Illuminating engineers have designed lighting systems for almost every kind of sport. Specific plans and descriptions of equipment will gladly be submitted upon receipt of detailed requests.

Type MUA is a universal, open type, 750 to 1500-watt floodlight which has a complete line of interchangeable and detachable reflectors.

Type ADE-16 is a universal 1000-watt unit of sturdy construction and high efficiency. The unit is dusttight and weatherproof, and is constructed entirely of corrosion-resisting metal.

Any light distribution desired, from that of a spotlight to the widest spread floodlight, is available.

CROUSE-HINDS COMPANY

SYRACUSE, N. Y., U. S. A.

WESTINGHOUSE ELECTRIC & MFG. CO.

Edgewater Park **LIGHTING DIVISION** Cleveland, Ohio

ATHLETIC FIELDS — Westinghouse floodlights of several types are available to meet specific requirements of schools and universities. They provide efficient illumination for football, baseball and soft ball fields, tennis courts and general school sportsfield lighting. Westinghouse floodlights have long-life, are economical to install and operate.

SWIMMING POOLS — Both for indoor and outdoor use, Westinghouse provides a line of Aqualux floodlights to meet every swimming pool lighting requirement. Underwater floodlighting prolongs the use of pools beyond the hours of daylight and insures the safety of swimmers. Aqualux floodlights provide a high standard of efficient and trouble-free performance.

LABORATORIES AND SHOPS — The Westinghouse line of industrial reflectors offers a wide range of selection for use in laboratories, shops, printing shops, gymnasiums, engineering buildings. The new Locklite line of reflectors, the Silvered Bowl Diffuser and the Stack Luminaire are ideally suited for school and university applications. These units offer effective light distribution at low maintenance and installation cost.

Lighting for Sports, Laboratories and Shops

VHR — Aluminum unit, with Swivel Cover, is Designed Especially for Athletic Fields

A-8 and A-10 — Small Lightweight Aluminum Units for Interior or Exterior Floodlighting

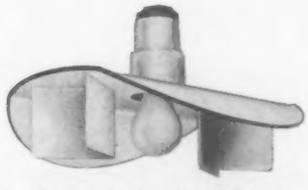
AFA-16 and AFA-20—Porcelain enameled, Open Type Units, with Aluminum inner reflectors for Football, Baseball and Other Athletic Field Lighting

WS-8 — Aqualux Underwater Floodlight for Outdoor and Indoor Pools

AH-14, AH-16, AH-20—Sturdy, Aluminum Enclosed Units for Building Floodlighting

CS-10 — Aqualux Underwater Floodlight Designed Specifically for 500-watt Lamps in Swimming Pool Applications

Locklite Reflectors are Ideal for all Kinds of Heavy-duty School Applications



Stack Luminaire for Libraries, File and Storage Rooms

Silvered Bowl Diffuser—A new Luminaire that Provides Well-diffused Light for Shops and Laboratories

ATLAS PORTABLE BLEACHERS

(Patented and further patents pending)

2170 E. Jefferson, Detroit, Michigan

WOOD

FOR FIFTEEN YEARS, ATLAS has made the outstanding Bleachers.

SAFETY. Insurance Companies were glad to issue policies, because of sound and safe construction.

SIMPLICITY. Easy to set up and take down, without the use of tools.

PORTABILITY. The nesting without waste of space has reduced handling and storage problems to a minimum.

ECONOMY. Proven over a decade. We know of many that have been in use the year round for over ten years, and are still "on the job."

THIS 15 YEAR RECORD has been established and our fine reputation earned by a combination of Malleable castings, Steel tension rods, WOOD and sound engineering.

(Typical installation of Atlas wood bleacher)

STEEL

THE ATLAS STRAN

MANY THOUSANDS OF DOLLARS have been spent in research—studying steel combinations, production costs, weights and all those vital factors that reliable engineers must know before their final approval is given the product. This has been done with the same thoroughness that has been shown in the past and has earned us the enviable reputation we have in the Bleacher field.

AFTER EXHAUSTIVE INVESTIGATION by our consulting engineers **STRAN STEEL** has been selected for the main structure.

HERE ARE THE REASONS

WEIGHT. Will weigh little more than our wood and steel structure, thus keeping freight rates at a minimum.

SAFETY A DEFINITE INCREASE, WITH THE STABILITY OF A PERMANENT STRUCTURE.

SIMPLICITY. Easier and faster to set up and take down.

AVAILABILITY. No restrictions as to height. Additional tiers can be added at any time. Sections that fit the gymnasium can be increased in tiers for the outdoor field, consequently doing double duty. Always the maximum seating capacity for a given space.

MAINTENANCE. This is practically nil as STRAN STEEL contains copper, consequently resists rust and corrosion. No more termite trouble.

COST. Amazing reduction in cost of Steel Bleachers.

Send for Detailed Descriptive Catalogue

ATLAS STRAN STEEL BLEACHERS

2170 E. Jefferson, Detroit, Michigan

LEAVITT CORPORATION

Urbana, Illinois

Featuring

LEAVITT LINES

Athletic Seating and Track Equipment

KNOCKDOWN Bleachers
(copyrighted)

TELESCOPING Bleachers

THESE PORTABLE BLEACHERS with interchangeable units originated in our plant in 1913. We started with a single 10 tier unit and since then have made many improvements — although we can cite many installations still in use after 20 years of service. ALL portable wood bleachers were copied from our original design and none have proven more satisfactory.

Wherever space or budget requirements necessitate portable bleachers you will find KNOCKDOWN Bleachers.

These are used by leading Private and Public Schools, Universities and Colleges, and by Army, Navy, Civic Centers, Industrial Concerns, Clubs, Fairs, Parks, Playgrounds, and any place of public gathering.

For modern gymnasiums we recommend modern seating. These bleachers may be opened or telescoped at a moment's notice, and one or more rows may be used as desired.

Outstanding features:

1. Permanently attached to wall—closed and locked when not in use without the use of floor plates—but with all the features of portable bleachers.
2. Stronger than safety factor requirements—but not overburdened with weight.
3. Simple in design and easy to operate—no springs or trick mechanical devices, or counterbalances; no false front woodwork. Rigidly constructed for safety and utility.

We have installations of either of the above types in your vicinity. Write us for full information.

We can also furnish Portable Steel Bleachers and Permanent *ADD-A-SEAT* Stadium.

Ask for our book "Seating Problems", and give us an idea of your requirements. We will be pleased to furnish you with complete seating layout.

ATHLETIC TRACK EQUIPMENT

The famous LEAVITT LINE of Discus, Javelins, Vaulting Poles, Hurdles, Shot, and other Track Equipment has been produced in our plant since 1905. We own the "GILL" Trademark and Patent (No. 1492976). We make no imitations, and only mature, skilled workmen are employed.

FRED MEDART MANUFACTURING CO.

3568 Dekalb St. St. Louis, Mo.

Manufacturers of

Gymnasium Apparatus—Basketball Backstops—Telescopic Gym Seats—Automatic Electric Scoreboard and Timer—Steel Lockers—Steel Wardrobes (The Lockerobe)—Steel Shelving

MEDART

Telescopic

GYM SEATS

with Floating Locomotion

Outstanding among the many features of this modern seating is the ease with which seats glide in and out of the "nested" position, in one operation. Use of the telescope principle eliminates the need for any counterbalance mechanism (springs) and consequently there is nothing to lift up or to pull down; no closure panel and no possibility of any parts of the seat falling on the operator. Understructure is of steel; all lumber parts are full length (not pieced) and are of substantial thickness (even the risers are solid, full length selected lumber—no flimsy material used anywhere in the construction). When Medart Gym Seats are installed in a gymnasium it is possible to quickly and easily provide a bench with a comfortable back rest for dances or special classes of instruction by simply withdrawing the one (lower) row of seats from the "nested" position, thus eliminating the need for folding chairs or other auxiliary seating. Medart Gym Seats are fully approved and recommended by the structural engineering department of one of our leading universities as a result of an exhaustive analysis and of actual tests made by these authorities.

Write for Gym Seat Catalog G5-2

GYMNASIUM APPARATUS AND BASKETBALL BACKSTOPS

Medart Gymnasium Apparatus which is today acknowledged as the ultimate in gymnastic apparatus perfection, is the result of continuous, uninterrupted manufacture and constant improvement, since 1873. . . . Likewise the Medart line of Standard and Special Basketball Backstops has kept pace with the growing popularity of this sport. Interested parties are invited to avail themselves of the competent services of the Medart Installation Engineers.

Write for Gym Catalog G-3 and Backstop Catalog BB-2

MEDART AUTOMATIC ELECTRIC SCOREBOARD AND TIMER

Precision built throughout. Streamlined, of all metal construction, the Medart Scorer and Timer weighs only 90 lbs. and is 74" long, 42" high and 5" deep. Black wrinkle finish surface with aluminum border. Translucent clock face of 27" diameter available with 8-minute quarters or 20-minute halves. Lighted (white) from rear until last minute of play when clock face automatically changes to bright red. Clock operates on 110 volt, 60 cycle synchronous movement and is equipped with positive "dead stop" brake; stops automatically and sounds extra loud, vibrator-type horn at end of each period. Easily read scoring numerals (6-8 volt lamps with aluminum reflectors) are 8½" high, instantaneously registering (0 to 99) from single scoring and timing control box (size 6" x 11½" x 2½"). Control box furnished with 15' of cable and 10-terminal connector plug. Many other desirable features. **Write for Complete Information.**

PITTSBURGH - DES MOINES STEEL COMPANY

3425 Neville Island, Pittsburgh, Pa.
Room 994—270 Broadway, New York
1215 First National Bank Bldg., Chicago
924 Tuttle Street, Des Moines, Iowa
1224 Praetorian Bldg., Dallas, Texas
614 Rialto Bldg., San Francisco, Calif.

All Steel Grandstands

Patent No. 1,452,467

PITTSBURGH-DES MOINES STEEL GRANDSTANDS are used on all types of athletic fields and for indoor arenas. They are built in standard sections 18 feet long by 10 rows deep, each section seating 120 people. A stand may be any number of sections long by any number of sections deep. Its seating capacity may be increased from time to time, double decked if necessary, and no matter how often enlarged it will always present a neat and finished appearance. A roof may be provided over all or a portion of the stand.

Note the sturdy construction of the deck and supports—clearly illustrated in the two close-up views. Substantial handrails surround the stand, and may also be installed to divide it into sections.

Louisiana State University Division at Monroe, La. Masonry Enclosure. Seating Capacity, 4000

Waterbury, Connecticut, High School. Masonry Enclosed Sdes and Rear. Seating Capacity, 4400

Southwest Stands—Penn State, State College, Pennsylvania, Seating Capacity 8160

Summit Hotel, Uniontown, Pennsylvania P·D M. All Steel Pool and Accessories

The wood seat planks supported on cast iron or welded steel stools are securely bolted down to the deck. Other types of seats are furnished if desired. Aisles, at proper intervals, extend from front to back with walkways along the front or back if necessary. Entrance or exit is accomplished by means of stairs or ramps at the lower end of each aisle, or through wells in the stand.

The steel deck is built to shed water. Hence the space under the stands may be utilized for dressing rooms, toilet facilities, storage, etc. In a number of instances masonry walls have been built along the ends and back so as to totally enclose the space under the stands.

These stands are permanent. They do not weather, rot or decay and therefore will not weaken and collapse. Their first cost is low, and they have a high salvage value. Being assembled by means of bolts, they can be dismantled and re-erected at another location—a feature not possible with other types of construction. An occasional coat of paint, the only maintenance necessary, keeps them looking new year after year.

Write our nearest office for our latest "All Steel Grandstands" Bulletin, and any additional information you may desire.

All Steel Swimming Pools

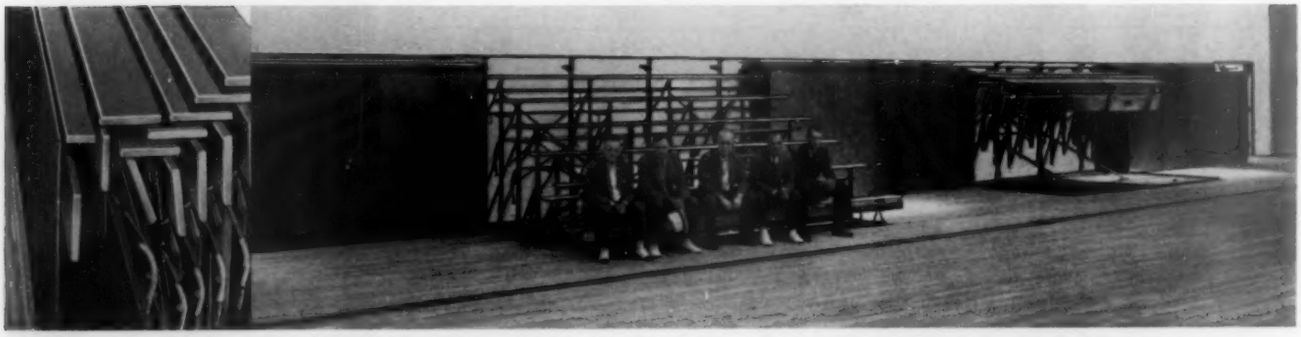
Pittsburgh-Des Moines All Steel Swimming Pools represent the best value in durability, economy and appearance to be obtained. Lower in first cost than properly-constructed pools of other materials, the P·D M. All Steel Pool requires no maintenance other than a coat of paint at reasonable intervals. It is absolutely watertight; withstands frost action and ground movement without harm; is smooth, sanitary and good-looking for a lifetime. P·D M. designs, fabricates and erects steel swimming pools complete with all accessories—under a responsible guarantee of satisfaction. Send for our "All Steel Swimming Pools" Bulletin No. 402—and if you wish, a free consultation on your problem.

UNIVERSAL BLEACHER CO.

Manufacturers of Folding Gymnasium Stands; Portable Bleachers and Portable Wood and Steel Grandstands

606 So. Neil Street, Champaign, Ill.

FOLD-A-WAY GYMNASIUM STANDS



COMFORTABLE, ROOMY SEATING

Universal Fold-A-Way Stands are rigid and safe. The seat and foot boards are of such width and placement as to assure maximum spectator comfort.

MORE USABLE GYMNASIUM SPACE

When closed these stands fold compactly against the wall, concealed behind beautifully finished solid cabinets, making available for athletic uses many additional square feet of floor space.

EASY ACCESS FOR CLEANING

Because cabinet and stand sections operate independently, these stands may be folded and the cabinets left open, assuring ready access to both floor and wall areas.

GYM FLOOR PROTECTION

The closure panel lays out on the floor for the stand to rest upon, thus protecting the floor. Self-contained locks operate automatically when the stand is opened or closed, eliminating holes in the gym floor and avoiding uncertain alignment with these holes as found in some of the roll or push type stands.

DIRECT SUPPORT AND X-BRACING OF SEATS

Each row of seats is supported every four feet on steel legs extending from seat to floor. Each vertical leg is diagonally X-braced against thrust and side sway.

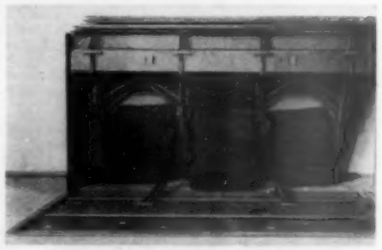
ROLL-A-WAY STANDS

We also make a roll type stand, similar in basic design to the Fold-A-Way, which rides open and closed on large composition casters. The design and bracing of this stand assures easy operation, adequate springs, full visibility, maximum safety to guests.

STEEL PORTABLE BLEACHERS

You will find in the Universal Steel Portable Bleacher many new and exclusive features of design; many refinements which add to the comfort and convenience of your guests; and many improvements which make the erection, dismantling, and moving of these bleachers both simple and easy. Vertical steel posts under each row rest on angle iron sills bolted to 2 x 6″ sub-sills, weather proofed against decay. Any number of rows can be added later to your initial installation, thus providing increased seating capacity as needed.

AUXILIARY CHAIR STORAGE



Where gymnasiums also serve as auditoriums, the auxiliary chairs may be stored beneath these stands; thus the chairs are instantly available for use and also partly distributed about the floor. Approximately 300 folding chairs can be stored beneath one eight-row section. Variations in stand height effect storage capacity.

TYPICAL INSTALLATIONS

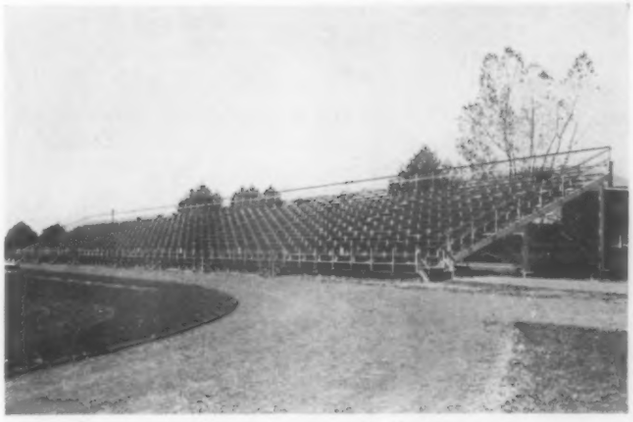
Albuquerque, N. M., Senior High School. Bellingham, Wash., Bellingham High School. Canisteo, N. Y., Central School. Chicago, Ill., St. Sabina Community Center. Cincinnati, Ohio, Withrow High School. Darlington, Wis., Darlington High School. Haverstraw, N. Y., High School. Kane, Pa., Kane High School. Los Angeles, Calif., Leuzinger High School (Lawndale). Mahopac, N. Y., High School. Minonk, Ill., Community High School. Norristown, Pa., Senior High School. Pendleton, Ore., Pendleton High School. Ravenna, Ohio, Charlestown Township School. Springfield, N. J., Regional High School. Swampscott, Mass., High School. Warren, Pa., Beaty School.

For estimates on Steel Portable Bleachers, let us know the approximate seating capacity needed and preference, if any, to number of rows desired.

WILLIAMS IRON WORKS, INC.

Designers, Manufacturers of Indoor and Outdoor Grandstands
Sectional — Portable — Permanent Stadia for All Mass Seating Requirements

430 East 102d Street, New York



Above—**Front and Side Views of Permanent Grandstand, Muhlenberg College, Allentown, Pa.**

For more than a quarter of a century the Williams Iron Works have specialized in designing and erecting grandstands, both portable and permanent. Correctness of engineering design, careful workmanship and use of structural steel that conforms to the rigid specifications of the American Society for Testing Material for Structural Steel for Buildings, characterize all Williams Grandstands.

COMFORT, VISIBILITY, SAFETY

On all Williams Grandstands there is sufficient room between rows to permit free leg room. Footboards are 18 inches wide, providing sufficient walking space. Sections are 16 feet long, and strong steel supports occur every 4′ 6″. Every Grandstand is constructed to hold four times the given load. A rise of nine inches between seatboards provides ample and unobstructed visibility.

WILLIAMS PERMANENT STADIA

Many large permanent steel grandstands both open and canopied have been constructed by this organization. Our staffs of engineers and designers will be glad to cooperate in furnishing comprehensive information.

WILLIAMS "CANTILEVER" FOLDING INDOOR GRANDSTAND (Illustrated below)

The "Cantilever" is a custom-built indoor grandstand that is on a par with the finest type of school construction. Perfectly counter-balanced, it opens and folds with a minimum of energy, and can be installed in any type of gymnasium. When set up, a locking device assures safety.

WILLIAMS "TYPE A" PORTABLE STEEL GRANDSTAND

"Type A" Grandstand is as fine and sturdy a steel portable grandstand as can be built. Seats and footboards are of first quality Oregon fir 1⅛″ thick, smooth planed and edges beveled. "Type A" is supplied in any number of rows from 2 to 50.

WILLIAMS "TYPE F" PORTABLE STEEL GRANDSTAND

"Type F" differs from "Type A" only in having a single instead of double footboard. Because of its low cost, it provides maximum safe seating facilities for the school with a limited budget. It is supplied in any height from 2 to 30 rows. Convenient payment terms can be arranged.

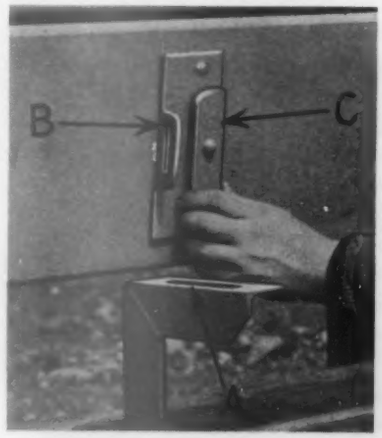
A Few of the Many Recent Installations of Williams Stands

World's Fair, New York
Yankee Stadium, New York
Tropical Park, Coral Gables, Fla.
Boston University, Boston, Mass.
Fordham University, New York
Muhlenberg College, Allentown, Pa.
High School, Montclair, N. J.
Boys' High School, Brooklyn
High School, Kulpmont, Pa.

At right—**Patented "Sta-Tite" Seat Locks**

Exclusive on Williams Grandstands

Seats will not rattle or bob, and are quickly attached to their steel supports. In the top angle of the seat support is a slot "A" into which the slotted projection "B" on seatboard enters. Movable bar "C" is turned into slot "B" and locks the seat securely into place. To remove seatboard, a hammer blow disengages bar "C." There are no loose bolts or removable parts in this foolproof lock.



THE MATHIESON ALKALI WORKS (INC.)

60 East 42nd Street, New York, N. Y.

PLANTS

Niagara Falls, N. Y., Saltville, Va., and Lake Charles, La.

BRANCH OFFICES

Charlotte, N. C., First National Bank Building
Cincinnati, Ohio, Dixie Terminal Building
Philadelphia, Pa., Widener Building
Chicago, Ill., 410 North Michigan Avenue
Houston, Tex., Second National Bank Building
Providence, R. I., Hospital Trust Building
Washington, D. C., 1625 Eckington Place, N.E.

PRODUCTS

- **H T H (Concentrated hypochlorite)**
- **H T H-15 (Germicide)**
- **Lo-Bax**
- **Liquid Chlorine**
- **Anhydrous Ammonia**
- **Aqua Ammonia—26°**
- **PH-Plus (Fused alkali)**
- **MaFoS (Dishwashing cleanser)**

SANITATION H T H

For a wide variety of sanitary purposes, particularly around the swimming pool, locker room and gymnasium, H T H is a most convenient and reliable source of available chlorine. Concentrated, H T H contains over 70% available chlorine. Moreover, it retains this high strength in warm weather and during long periods of storage.

H T H is a dry, free-flowing powder, readily soluble in water. It is shipped in cases of nine 5-lb. cans.

For Swimming Pools

At thousands of swimming pools throughout the country, H T H is used to chlorinate pool water, for general disinfection of surroundings and for prevention of Athlete's Foot. A sanitation routine which provides germicidal and fungicidal protection in and around the pool is easy and economical to follow with this concentrated hypochlorite. (Write us for complete directions.)

For pool water purification, H T H can be added direct to the pool in powder form, or fed in solution form with simple, inexpensive equipment. At many pools where liquid chlorine is used for regular chlorination, a supply of H T H is kept on hand for emergency use in case of a breakdown of pumps or chlorinating equipment, or an interruption in the power supply.

To Prevent Athlete's Foot

Locker rooms, shower rooms, toilets, pool runways, etc., are undoubtedly among the worst offenders in the spread of Athlete's Foot.

Health authorities agree that the best preventive is a careful sanitary routine which includes the use of hypochlorite solutions such as those made from H T H and Lo-Bax, both in footbaths and for general disinfection of surfaces which may transmit infection. Moreover, many States now require hypochlorite footbaths at public pools.

Sterilizing and Bleaching

School laundries, like commercial laundries, find that H T H solutions are uniform and economical for bleaching and sterilizing linens, towels, uniforms and other white goods, and as a sterilizing rinse for cotton bathing suits. H T H enables them to avoid the danger of over-bleaching, which shortens the life of fabrics, and the alternate danger of inadequate protection.

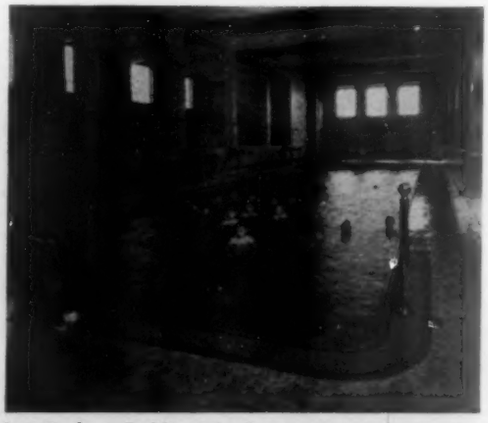
OTHER MATHIESON PRODUCTS

H T H-15—An all-purpose germicide and deodorant which is ideal for use in school kitchens, dormitories, camps, etc. H T H-15 contains 15% available chlorine and is simply added direct to water by the spoonful.

Lo-Bax—A convenient chlorine carrier packed in 1¼-lb. bottles and containing 50% available chlorine. For preparing footbath solutions and for use around shower and locker rooms where limited quantities of hypochlorite are required.

PH-Plus—A fused alkali manufactured especially for restoring to swimming pool water the natural alkalinity it loses in use and during filtration. Makes pool water "feel fine."

MaFoS—A new type of cleanser for dishwashing machines which comes in the form of dense, water-free briquets. Tests prove it more efficient and economical than powdered cleansers.



Swimming Pool at Public School No. 12, Troy, N. Y., Where H T H Is Used to Protect Against Athlete's Foot

PENNSYLVANIA SALT MANUFACTURING CO.

ESTABLISHED 1850

Widener Bldg., Philadelphia, Pa.

New York Chicago St. Louis Pittsburgh Tacoma Wyandotte

THE ONLY WAY you could be sure to keep athlete's foot out of your swimming pool would be to keep swimmers out too. But there is an easy way to be safe, as hundreds of pools have learned. Use a hypochlorite footbath and place it where every swimmer must step through it. This is a recommendation of leading health authorities. For sure results at low cost, use the hypochlorite, Perchloron.

Containing more than 70% available chlorine, Perchloron is a dry, white, free-flowing powder that dissolves readily in water. It is concentrated, keeps well, and holds its strength. Packed 9 cans to the case, each can with the handy replaceable cover.

Many pools use Perchloron, not only to combat athlete's foot, but to chlorinate pool water, and as a disinfecting spray for locker rooms and washrooms. Write for free booklet on the use of Perchloron for athlete's Foot Control and for Swimming Pool Chlorination.

KORK-N-SEAL Cover which opens and locks airtight with a finger flip.

Perchloron

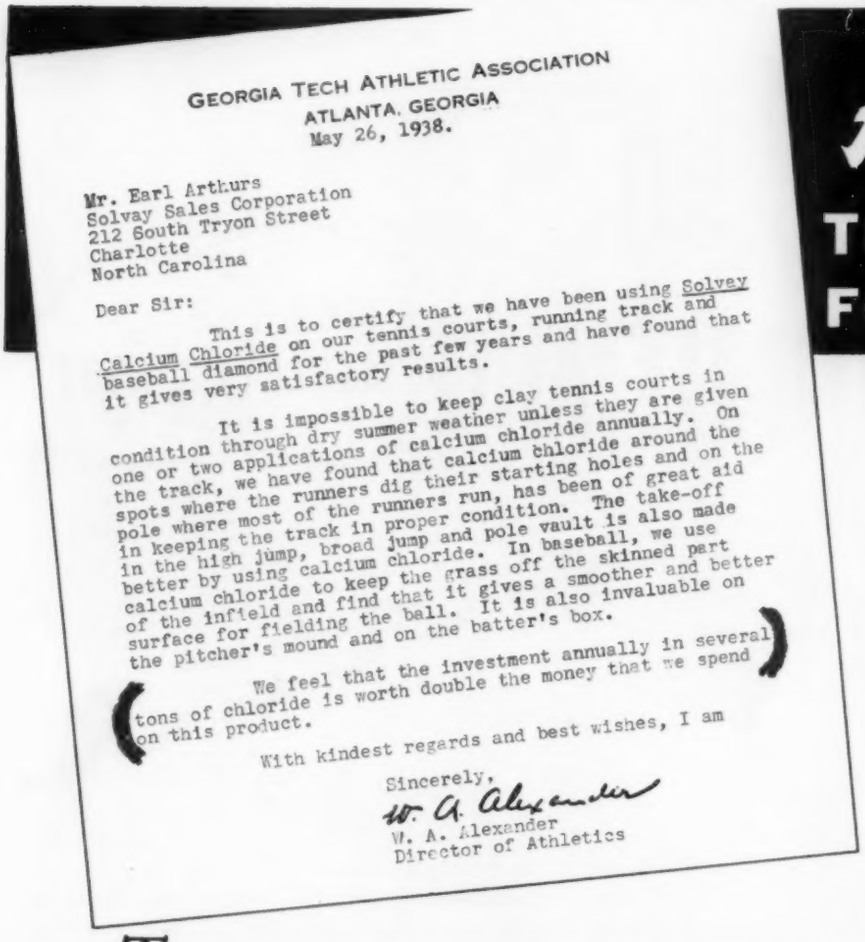
SOLVAY SALES CORPORATION

Alkalies and Chemical Products Manufactured by The Solvay Process Company

40 RECTOR STREET, NEW YORK, N. Y.

BRANCH SALES OFFICES:

Boston, Charlotte, Chicago, Cincinnati, Cleveland, Detroit, New Orleans, New York, Philadelphia, Pittsburgh, St. Louis, Syracuse



GEORGIA TECH ATHLETIC ASSOCIATION
ATLANTA, GEORGIA
May 26, 1938.

Mr. Earl Arthurs
Solvay Sales Corporation
212 South Tryon Street
Charlotte
North Carolina

Dear Sir:

This is to certify that we have been using Solvay Calcium Chloride on our tennis courts, running track and baseball diamond for the past few years and have found that it gives very satisfactory results.

It is impossible to keep clay tennis courts in condition through dry summer weather unless they are given one or two applications of calcium chloride annually. On the track, we have found that calcium chloride around the spots where the runners dig their starting holes and on the pole where most of the runners run, has been of great aid in keeping the track in proper condition. The take-off in the high jump, broad jump and pole vault is also made better by using calcium chloride. In baseball, we use calcium chloride to keep the grass off the skinned part of the infield and find that it gives a smoother and better surface for fielding the ball. It is also invaluable on the pitcher's mound and on the batter's box.

We feel that the investment annually in several tons of chloride is worth double the money that we spend on this product.

With kindest regards and best wishes, I am

Sincerely,
W. A. Alexander
W. A. Alexander
Director of Athletics

A Letter THAT SPEAKS FOR ITSELF ..

Regarding

ATHLETIC FIELDS
TENNIS COURTS
PLAY GROUNDS
BASEBALL DIAMONDS
TRACKS
HANDBALL COURTS
PARADE GROUNDS
PARKING FIELDS
DRIVES
WALKS
ROADWAYS

This letter is typical of many other letters received by Solvay. So that you may have the complete story on Solvay Calcium Chloride, write for the comprehensive 28 page booklet "The Clean, Easy, Inexpensive Way to End Dust." Write to Department 49, SOLVAY SALES CORPORATION, 40 Rector Street, New York, N. Y.

SOLVAY CALCIUM CHLORIDE

CLEAN, ODORLESS, NON-STAINING TREATMENT FOR ENDING DUST AND CONTROLLING WEEDS

WALLACE & TIERNAN COMPANY, INC.

Manufacturers of Chlorine and Ammonia Control Apparatus

Main Office and Factory: Newark, New Jersey

"SWIM IN DRINKING WATER"

Boston, Bridgeport, Buffalo, Charlotte, Chattanooga, Chicago, Cleveland, Columbus, Dallas, Denver, Detroit, Indianapolis, Jacksonville, Kansas City, Knoxville, Lexington, Los Angeles, Madison, Minneapolis, Oklahoma City, Philadelphia, Pittsburgh, Roanoke, San Francisco, Seattle, St. Louis, Syracuse, Washington, D. C.

Wallace & Tiernan, Ltd., Toronto, Canada
Wallace & Tiernan, Ltd., Winnipeg, Canada
Wallace & Tiernan, Ltd., Montreal, Canada
Wallace & Tiernan, Ltd., London, England

With the school swimming pool firmly established as a part of the physical training program, efficient sterilization is necessarily important. School executives can do no better than to follow advice given in the Report of the Joint Committee of the American Public Health Association and the Conference of State Sanitary Engineers. This report, in part, states: "From all available information, the addition of chlorine either as a gas or water solution by use of proper apparatus is today the most satisfactory method of pool disinfection." Chlorine alone gives the residual penetrating action for the complete protection of bathers at every point in the pool. More than 4000 swimming pools in the United States today rely on W&T chlorinators for positive disinfection.

"Swim in Drinking Water"

W&T Type MSE Chlorinator—For the majority of indoor pools and smaller outdoor pools, where chlorine requirements are less than twelve pounds per day, this type apparatus is most suitable. With a feed range sufficiently wide to include all changes in bathing load or recirculation rate, it is accurate and dependable in operation and may be safely entrusted to non-technical help.

W&T Type MSE Chlorinator for the Sterilization of Average Sized Swimming Pools

W&T Type MSV Chlorinator is the efficient sterilizer for large pools, having heavy bathing loads. Simplified design and sturdy construction have combined to make unusual performance records for this type of chlorinator. Of more than 5000 installed since the first went into service fifteen years ago, not a single machine has ever worn out. A survey of repair costs indicates average annual maintenance charges do not exceed one per cent of the initial investment.

W&T Ammoniator — Used with a W&T Chlorinator for the additional advantages of chlorine-ammonia treatment. Particularly in large outdoor pools where heavy bathing loads occur, chlorine-ammonia treatment improves operation by maintaining effective sterilizing action throughout the pool without complaints of tastes or odors. Additional advantages are found in improved algæ control in filters and on pool walls. W&T Ammoniators embody the same rigid production standards and excellence of material as W&T Chlorinators, differing only in the special materials required for handling ammonia.

W&T Ammoniator Used with a W&T Chlorinator to Produce Chloramine

W&T Chlorine Comparator—Swimming pool chlorination can only be controlled accurately, economically and safely when regular use of the orthotolidin test is made. The W&T Hellige Chlorine Comparator meets all requirements for a rugged, portable, accurate testing outfit. Its operation is so simple that accurate determinations of residual chlorine require only a moment's time and no specialized knowledge.

At Your Service—A W&T nationwide staff of skilled water purification experts are prepared to offer recommendations on any problems of swimming pool sterilization. The continued satisfactory operation of W&T equipment is their direct responsibility.

Current literature on swimming pool sanitation and W&T equipment is available on request.

AMERICAN PLAYGROUND DEVICE CO.

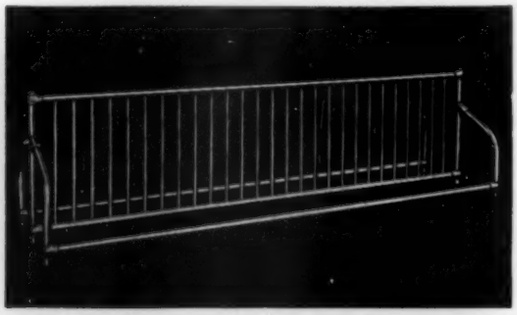
Anderson, Indiana, U. S. A.

Foremost Manufacturers of Foot Baths for Athlete's Foot—Chain Link Tennis Nets Gym Mats—Floodlights—Diving Boards—Bicycle Racks—Playground and Pool Equipment

PRODUCTS

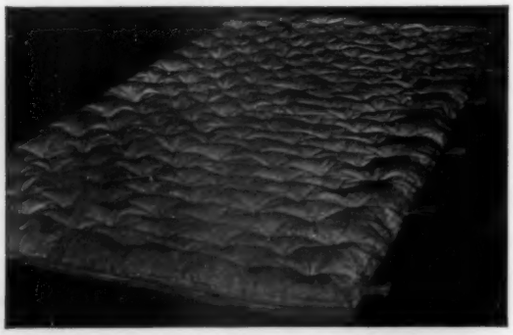
American School Equipment includes Gym Mats—Foot Baths — Diving Boards — Pool Equipment — Chain Link Tennis Nets — Ornamental Playground Fence — Playground Equipment and Bicycle Racks. Send for information and prices — please mention name of item in which you are interested.

AMERICAN BICYCLE RACKS



American Bicycle Racks are the permanent solution to that "Bicycle Parking" problem—used nationally.

AMERICAN GYM MATS



American Gym Mats are springy and resilient—offer greatest economy and durability.

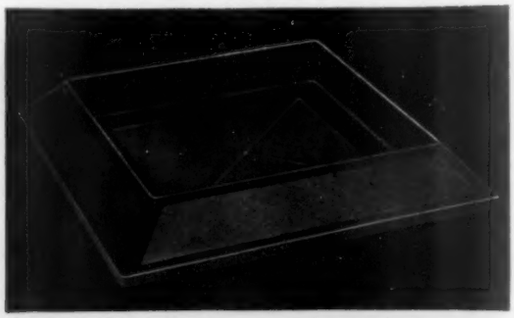
CHAIN LINK TENNIS NETS

American Chain Link Tennis Nets lead in durability and performance—Used by nation's largest Schools and Colleges.

GUARANTEE AND SERVICE

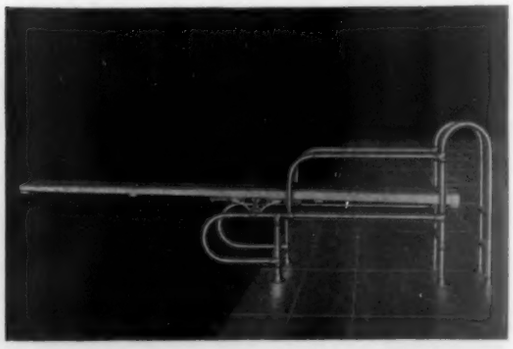
American products are Approved and Specified by leading School Authorities from Coast to Coast. Each item fully guaranteed—all shipments made promptly, no waits or delays.

FOOT BATHS FOR ATHLETE'S FOOT



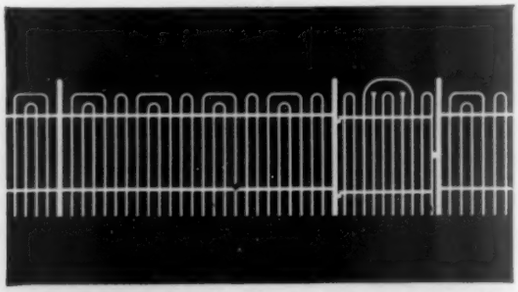
American Foot Baths and Hypochlorite are guaranteed to kill Athlete's Foot Fungi in less than 30 seconds.

SWIMMING POOL EQUIPMENT



American Pool equipment is foremost in construction and performance—Use American Official Regulation Diving Boards for dependability.

AMERICAN ORNAMENTAL FENCE



American Ornamental Fence is practical and durable—essential for the protection and beautification of school property.

AMERICAN PLAYGROUND DEVICE CO.

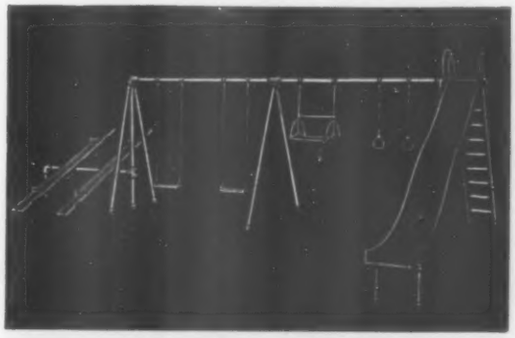
Anderson, Indiana, U. S. A.

Manufacturers of Playground Equipment—Swimming Pool Equipment—Diving Boards
Gym Mats—Foot Baths and Hypochlorite for Athlete's Foot
Chain Link Tennis Nets

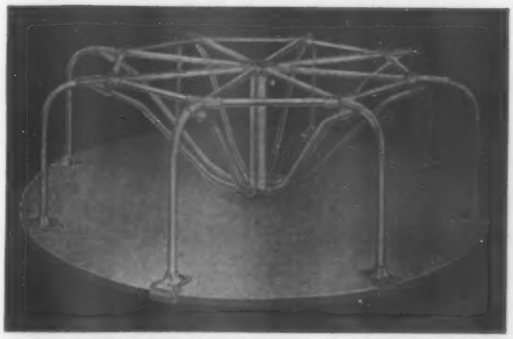
PRODUCTS

American Playground Equipment is Approved and Specified by leading School Authorities—the American line includes everything for playgrounds—Swings, Slides, See-Saws, Castle Towers, Wave Strides, Ocean Waves, Combination Units, Merry-Go-Rounds, Giant Strides and a hundred other proven items.

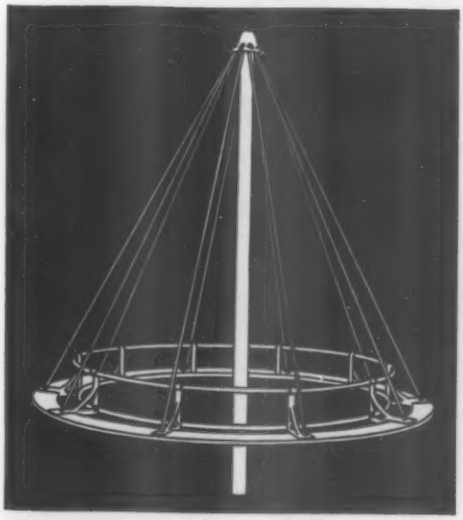
AMERICAN COMBINATION UNITS



M-4 MERRY-GO-ROUND



OCEAN WAVE



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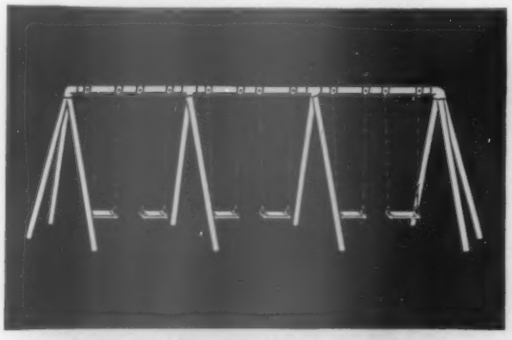
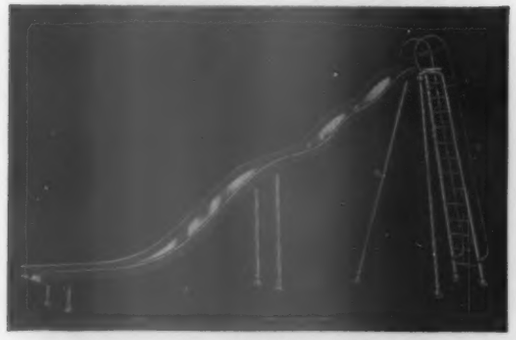
Complete literature and prices gladly sent on request. Each product is backed by our nation-wide reputation for Integrity and Dependability—We make prompt shipments, no waits or long delays.

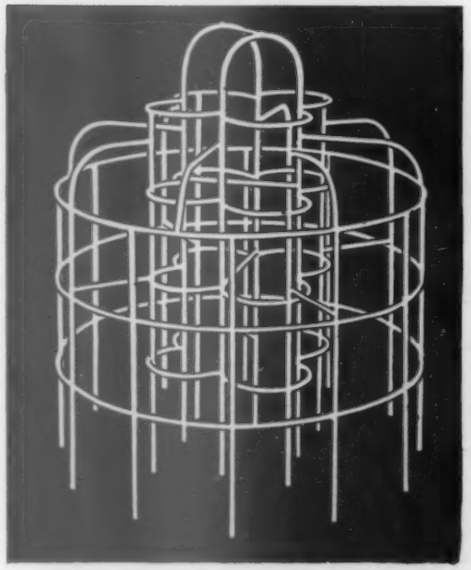
AMERICAN SWING SETS



AMERICAN ALL-METAL SLIDES



CASTLE TOWER



AMERICAN EQUIPMENT IS APPROVED AND SPECIFIED BY SCHOOL AUTHORITIES FROM COAST TO COAST

Each American product is guaranteed and backed by our 25-year reputation of Integrity and Responsibility. Our complete line is thoroughly tested and proven. Send today for our complete literature and prices on items shown on this page or opposite page—please mention item in which you are especially interested.

★ ★ ★ ★ ★

THE EVERWEAR MANUFACTURING COMPANY

Springfield, Ohio

EverWear

Playground Apparatus, Swimming Pool Equipment, Basket Ball Backstops

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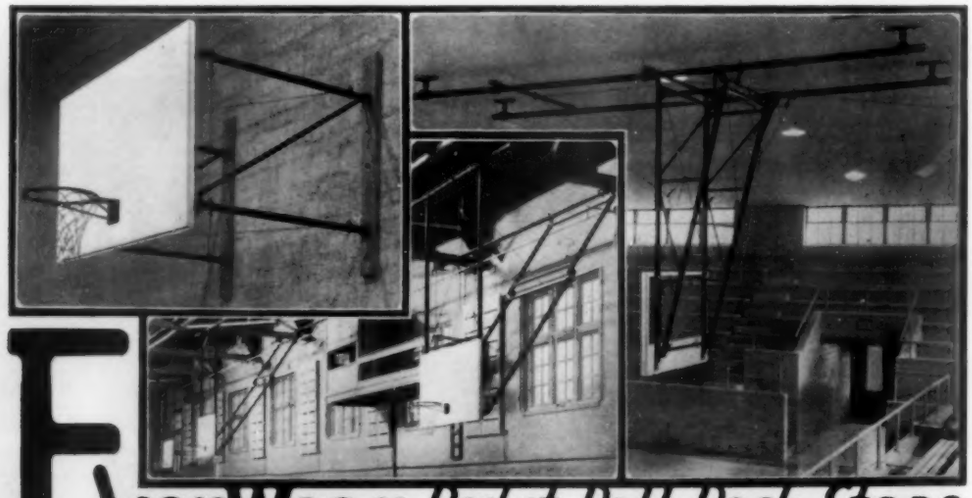


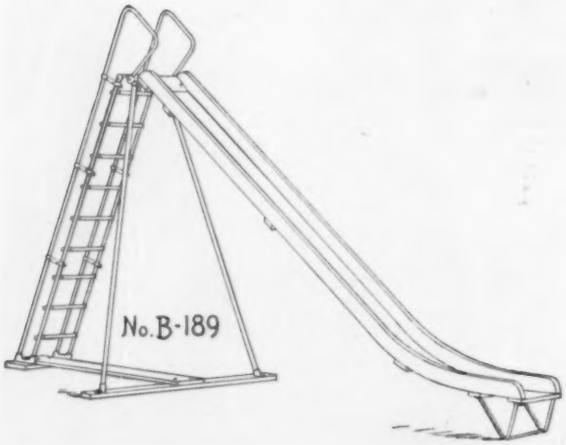
EverWear Basket Ball Back Stops SOLVE THE PROBLEM

In EverWear Recreation Apparatus, SAFETY is the controlling factor. DURABILITY, a by-product of proper designing and strength in construction, too, is an EverWear feature.

SAFETY, DURABILITY, BEAUTY AND PLAYABILITY
are built-in features of each EverWear outfit

COMPLETE LINES:

Playground Apparatus, Beach and Swimming Pool Equipment, Basket Ball Backstops



MITCHELL MANUFACTURING CO.

Milwaukee, Wisconsin

Playground Apparatus
Beach and Pool Equipment
Fold-O-Leg Tables

"Betterbilt"

Folding Choral Stands
Folding Band Stands
Sanitary Barn Equipment

FOR THE SWIMMING POOL

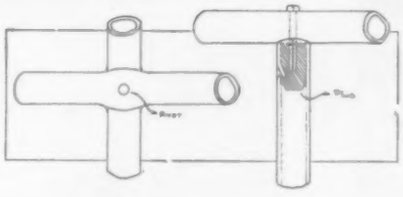
DIVING BOARDS
WATER SLIDES
LADDERS
TOWERS
STANDS, Etc.

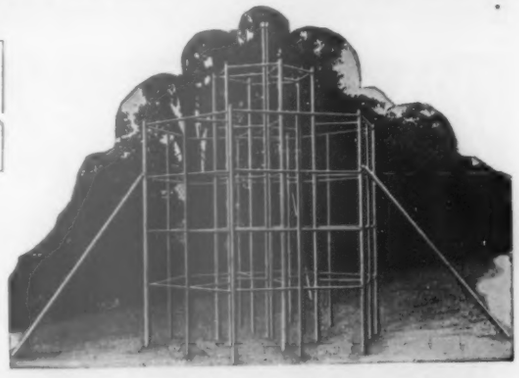
Mitchell Laminated Diving Boards are specially treated and guaranteed. Eliminate seasonal experimentation by trying just one of these boards. Write today for Booklet No. 2.

Safety THE IMPORTANT FEATURE OF ALL MITCHELL "BETTERBILT" APPARATUS

SAFETY FITTINGS

Special Design eliminates exposed bolt ends and nuts on Mitchell Climbing Gyms and Pool Equipment. Extra-rigid, strong, foolproof corners and joints cannot possibly injure children or tear clothing.





SOLID STEPS, HEAVY GUARD RAIL

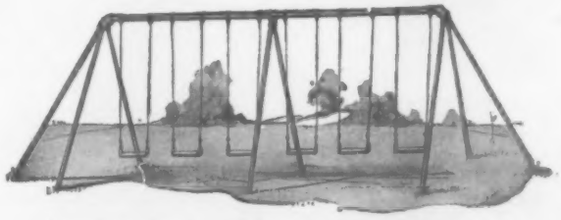
Steps on all slides are made of heavy malleable iron, perforated for safety. Guard rails correctly designed and well braced.

CLIMBING IS INSTINCTIVE FOR MOST CHILDREN

Every playground device in the complete "Betterbilt" line reflects the many years of study devoted to the physical welfare and wholesome amusement of boys and girls — Tomorrow's Citizens. Write today for Booklet No. 1.

Mitchell Swing Hanger

MITCHELL ALL STEEL SLIDES ARE SAFE AND ECONOMICAL



Mitchell Swing Outfits are equipped with hangers which have extra bearing surface—increasing life of chain and hooks. Heavy malleable iron of extra tensile strength.

BOOKLETS
(Illustrated)

1. "Betterbilt" Playground Apparatus
2. "Betterbilt" Pool Equipment
3. Mitchell Fold-O-Leg Tables—see page 366
4. Mitchell Folding Choral Stands —see page 366
5. Mitchell Folding Band Stands—see page 366
6. Mitchell Sanitary Barn Equipment

RECREATION EQUIPMENT CO.

Manufacturers of Play Equipment for Playgrounds, Parks, Pools and Beaches

724-26 West Eighth Street, Anderson, Indiana

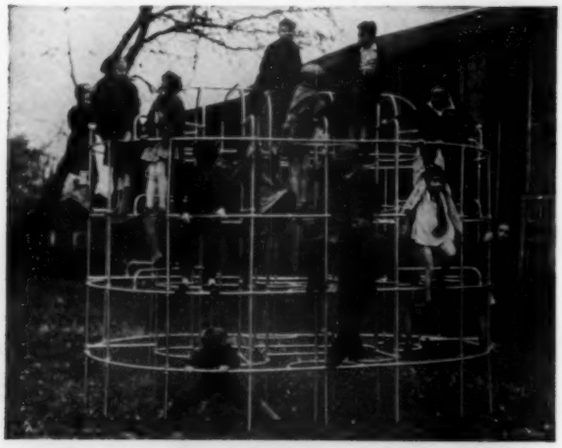
FOR THE PLAYGROUND

Swings, Slides, Merry-go-round, "Monkey Jungle", Gym Combinations, See-Saw Sets, Ocean Wave, etc.

THE RECREATION LINE

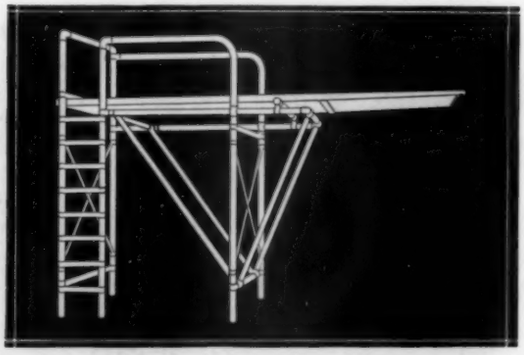
FOR THE BEACH AND POOL

Diving Board Outfits, Pool Ladders, Slides, Life Guard Chairs, Pool Cleaning Equipment, Diving Mask Outfits, etc.



MONKEY JUNGLE No. 389

This is without doubt the best designed and constructed climbing device on the market. Other sizes shown in complete catalog, sent for the asking.

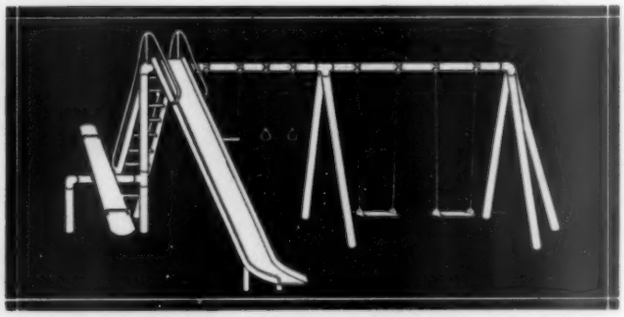


THREE-METER DIVING BOARD OUTFIT, No. 480

Many types of Diving Board Frames, and both one-piece and laminated boards produced. RECREATION Boards used in most of the major National Championships. Fully described in catalog.

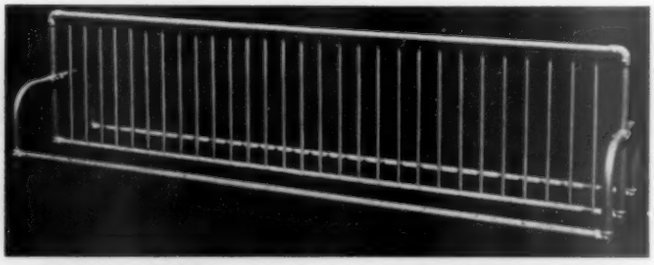
Write for Free Catalog

RECREATION EQUIPMENT COMPANY
ANDERSON, INDIANA



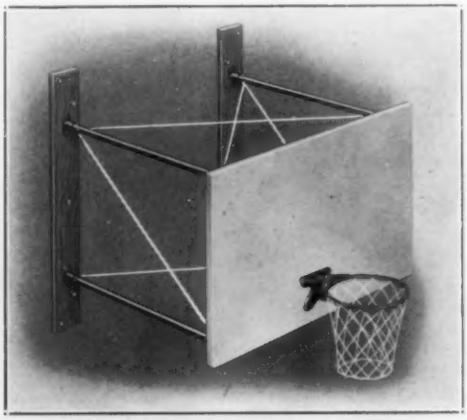
GYM COMBINATION No. 429

This is only one of many gym combinations which we manufacture. Ask for catalog.



BICYCLE RACK No. 5000

These are made of hot-galvanized steel and malleable construction. Rust proof and practically indestructible. Made in three weights and in different length sections, both in Duplex and Single-side design. Illustrated and described in catalog.



WALL TYPE BASKETBALL FRAME No. 5-P

We also manufacture the Swing-up and Portable Types, using either Plywood or All-Metal Backboards and supplied with best official Goal. Fully illustrated and described in catalog.

SECTION VII
CLASSROOM—LIBRARY—AUDITORIUM

JUNIOR HIGH-SCHOOL CLASSROOMS

By RALPH EVANS HACKER

of Hacker & Hacker, Architects, Fort Lee, N. J.

THE majority of boards of education and their architects are faced with the problem of limited funds for providing a school plant. It is obligatory that expenditures be justified by results, and it is therefore good judgment to err on the side of simplicity and economy. The basis for functional planning should be a reasonable and practical use of facilities rather than a seldom, if ever, realized Utopian use. Rooms in small high schools must be designed for multiple use and must furnish an environment suitable for more than one subject or activity.

Every junior high-school classroom has certain fundamental requirements, varying in their proportion with the activity for which it is to be used, the teaching methods, class size, financial resources available, and the climate of the section. No one classroom layout can be accepted as satisfactorily meeting all conditions, even though for one use.

The important items to be considered are: the environment to be created; class size; subject matter and how taught; floor area per pupil; dimensions of the room, including ceiling height; glass area; window height; artificial lighting; heating and ventilating; floor, wall and ceiling finishes; accessories—exhibition board, chalkboard, bookcases or shelving, storage of students' projects, equipment storage, shades; furniture, facilities for wraps.

Classroom Area

Much discussion is taking place as to what constitutes a satisfactory area per pupil for academic classrooms. A check with a number of high-school principals and teachers indicates that the majority are satisfied with a clear area of 18 square feet per pupil, and that little would be gained educationally by increasing this amount. Some believe that the 16½ square feet required by New York State is sufficient, and a few would like slightly larger rooms. The activities to be carried on and the type of furniture used have a bearing on this problem. For small classes the depth of the room will have to be increased.

Ceiling heights are related to volume and room widths.

Natural Lighting

Ample natural light is essential. Here again, proponents are found for percentages of glass area equaling from 20 to 50 per cent of the floor area. Where no exterior obstructions exist and with a proper window height, 20 per cent glass area has been found to be adequate. In some sections subject to brilliant light it is advisable to reduce this percentage. Light and dark shades or drapes are desirable for eliminating direct sun and for darkening the room.

A survey of a number of schools in different states has shown that from 25 to 75 per cent of the classroom glass areas were obstructed by drawn window shades, even though no sun was on that particular room. One library, with shades drawn, had a reading of from 7 to 2 foot-candles. Raising the shades increased this to a minimum reading of 35 f.c. Here is an opportunity for better lighting with no increase in cost. Classroom lighting intensity is greatly reduced by walls and ceilings that are dirty or finished in colors of low light-reflecting values.

Many advocate the use of glass blocks instead of plain glass for classroom windows. The advantages are insulation and elimination of glare. The disadvantages include the necessity and expense of operatting the ventilating system for the entire school year, regardless of how moderate the weather may be; a considerable reduction in the light transmitted from the amount transmitted by ordinary window glass; and a considerable increase in cost over the plain window glass. Plain glass panels should be provided in walls of glass block to enable the student to rest the eye muscles by looking a greater distance than

the classroom length or width. In construction, care must be taken to ensure that glass block joints are made water- and air-tight.

Artificial Lighting

Artificial illumination will generally consist of from four to six ceiling units of either flush or suspended type and may be of indirect, semi-direct or direct type.

Indirect units give the best diffusion of light, but consume approximately one-third more current and require larger lamps than the direct type. The greatest objection is the reduction in efficiency from dirty ceilings and failure to keep the reflecting surfaces of the fixture free from dust.

Enclosing globes for the direct type should be selected with discrimination. Redirection and diffusion of the light output from the lamp, and the use of a type of glass that eliminates glare but does not reduce the light output, are the factors to be considered.

Light controls may be from a single- or a two-gang switch, or from a photo-electric cell.

The two-gang switch offers the supposed advantage of being able to light the inner row of lights when natural light is failing. Lighting the inner row only is more economical than lighting all the lights, but will generally throw an objectionable cross-shadow on the students in the near rows between the light and the windows.

The photo-electric cell is desirable for supplying artificial light when needed, but is costly. Its use brings up other problems such as cutting off the photo-electric cell during class periods when the room is vacant, during the noon hours and after school, yet having manual control of the lighting of individual rooms when the photo-electric cell is not in operation.

Heating and Ventilating

Heating and ventilating is usually by (1) the split system type; or by (2) heating and ventilating units in the room with direct radiation; or by (3) window ventilation with direct radiation and mechanical exhaust.

Thermostatic control is desirable. To properly regulate manual control distracts the teacher and loses the attention of the class.

Floors—Ceilings—Walls

The finish floors may be of wood, linoleum or mastic tile.

Maple is a close-grained wood well suited for wood finish floors. Comb-grained, North Carolina pine is also used. The expansion caused by humidity in the summer, and the contraction when the heating system is in operation, together with the refinishing of the surface, have caused the supplanting of wood by other materials in many of the newer buildings, except for shop and gymnasium use.

Where linoleum or mastic tile is used, glides of large diameter should be used on the bottom of all furniture.

Ceilings should be of acoustical material. Many materials are on the market today which will reduce reverberations to a satisfactory period of approximately 1.1 seconds. Acoustical treatment for sound comfort should be distinguished from the soundproofing required for music rooms, etc.

Walls may be of colored plaster or of white plaster painted. The extensive use of wallpaper is not desirable, because of the difficulty of cleaning, the need of patching and replacing, and for the very important reason that it is quite sure to be left on long after it should be replaced. In the attempt to secure varied and attractive patterns, there is the strong probability that the importance of selecting patterns and colors with high light-reflecting values will be overlooked.

Furniture—Storage Provision

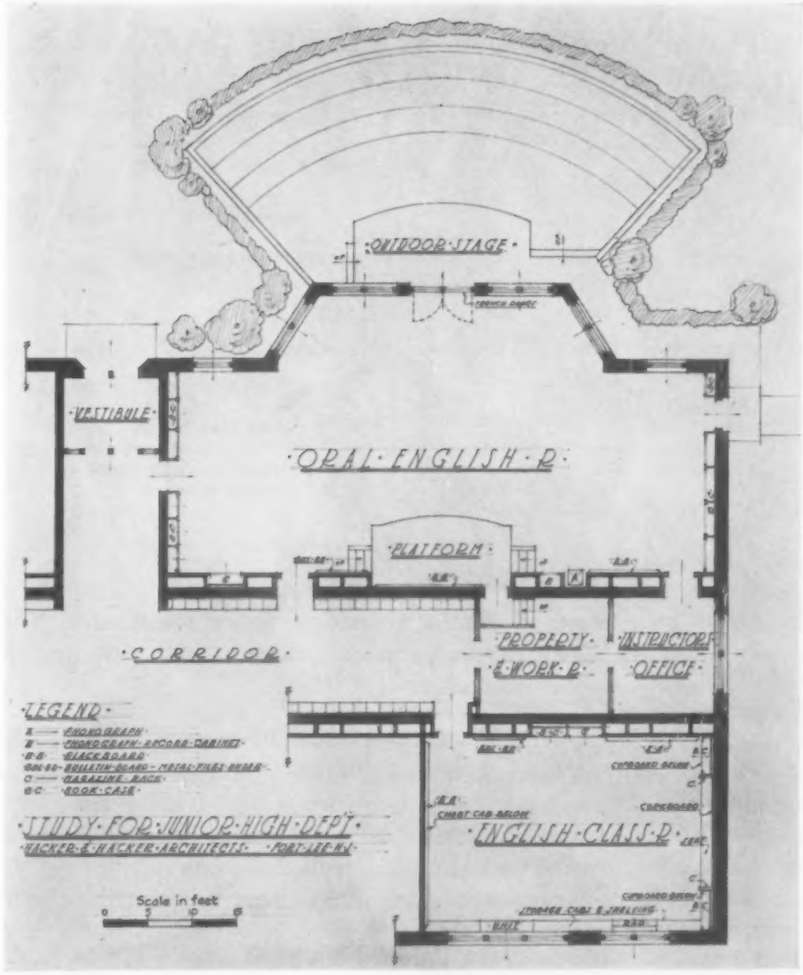
Movable furniture is the most popular for use in classrooms. A comfortable and sturdy type should be selected from the many available. It should not tip easily or permit the student to generate a rocking-chair or springboard action.

In the teaching of foreign languages and social science, more and more equipment and charts are being used. These, and other subjects, require storage cabinets which may be installed below window stools or the lower section of bookcases, or recessed in unused flue spaces. The chart cases, generally about 2 feet 6 inches x 3 feet 3 inches, will be convenient to the instructor and will fit very nicely below the front board.

Chalkboards—Display Boards

The amount of corkboard and chalkboard provided for each classroom will depend on the subject or subjects to be taught. Mathematics rooms require more chalkboard than social science rooms. Many teachers of English, outstanding for the educational results consistently achieved with their junior high-school pupils, are of the opinion that too little blackboard is provided in the English rooms. They feel that during the junior high-school years both sentence and paragraph structure must be stressed if the pupil is to have the necessary foundation for later work. Chalkboard activity not only assists students to acquire this foundation, but tends toward better morale, in giving a desirable outlet for pupils' restlessness.

A pinning strip on the walls near the ceiling for fastening large posters, paintings by the students, etc., and display rails on the trim above the exhibition and



Above—This suggested plan for an oral English room permits two classes at one time, saving the expense of one teacher. It serves for pupil, teacher and after-school community activities. The small stage will permit presentation of dramas, debates and guest speakers. An outdoor platform and small amphitheater would be useful for these activities in a more natural setting

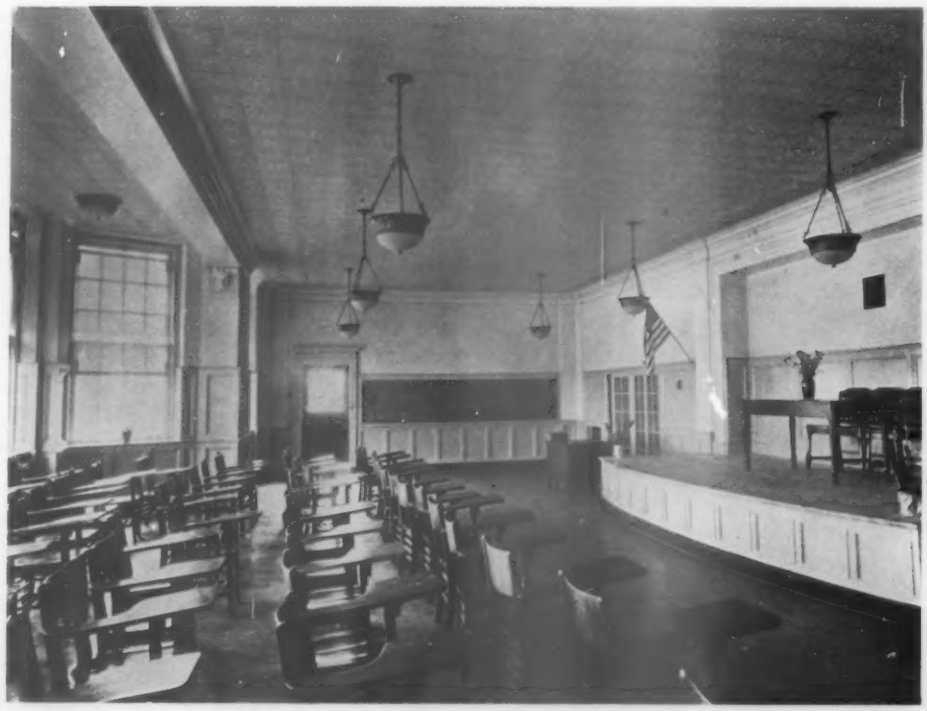
chalkboards, assist in producing the environment and emphasis desirable for a particular study or activity.

Pictures, paintings, objects of art, which represent some current interest of the group, should be used in the classroom. Plants and simple drapes help to create a homelike atmosphere.

Reference Facilities

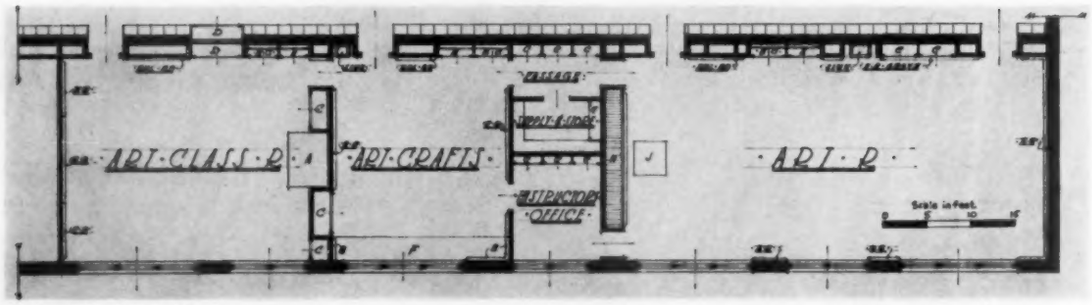
Few students in junior high-school work are proficient in library research and working texts. Reference books and periodicals are therefore needed in the classroom. Shelving, bookcases and magazine racks, supply-cupboards, and student project storage, should be provided in the amount needed for the activity to be carried on. The location and arrangement can be varied. The results will depend on the skill of the architect and his knowledge and understanding of the educational objectives and functional use of the room.

The English room will need provision for many books. A comfortable seat in a shallow alcove between two bookcases at the rear of the room, with corkboard above the seat, makes an attractive and usable arrangement.



Right—Oral English room in the Teaneck, N. J., Junior High School

Hacker & Hacker, Architects



Hacker & Hacker, Architects

Plan of an art department to meet junior high-school requirements

LEGEND

A	Stereopticon platform	C	Supply cabinet	G	Model case
B	Tool rack	D	Exhibition case	H	Drawing-board cabinet
B. B	Blackboard	E	Magazine rack	J	Movable model's platform
B. C	Bookcase	F	Work top—supply cabinet and individual work boxes under	E. B	Exhibition board

In less degree, the foreign language rooms will need chalkboard and reference facilities similar to those in the English classroom. The walls should be soundproofed. This will prevent interruption of an inspiring literature lesson by sounds of a beginning class in the next room struggling for perfection in oral expression.

Booths for gramophone or linguaphone are sometimes urged for foreign language classrooms. Educators who have carefully studied the problem advise against this additional expense for plant and equipment as unnecessary, particularly for junior high schools. They prefer one machine used in common for the entire class, with concert pronunciation, to a series of booths for one or two students each. The booths require purchasing three or four machines instead of one.

Radio—Visual Instruction

The central radio, preferably double channel, is playing an increasing part in school instruction.

Electric outlets for sound pictures, and controls, should be installed in each classroom.

A separate room for common use should be provided for storage of visual instruction slides and equipment rather than storing the slides in each room.

Library in the Junior High School at Teaneck, N. J.

Hacker & Hacker, Architects

Music room in the Teaneck, N. J., Junior High School
Hacker & Hacker, Architects

Department Layouts

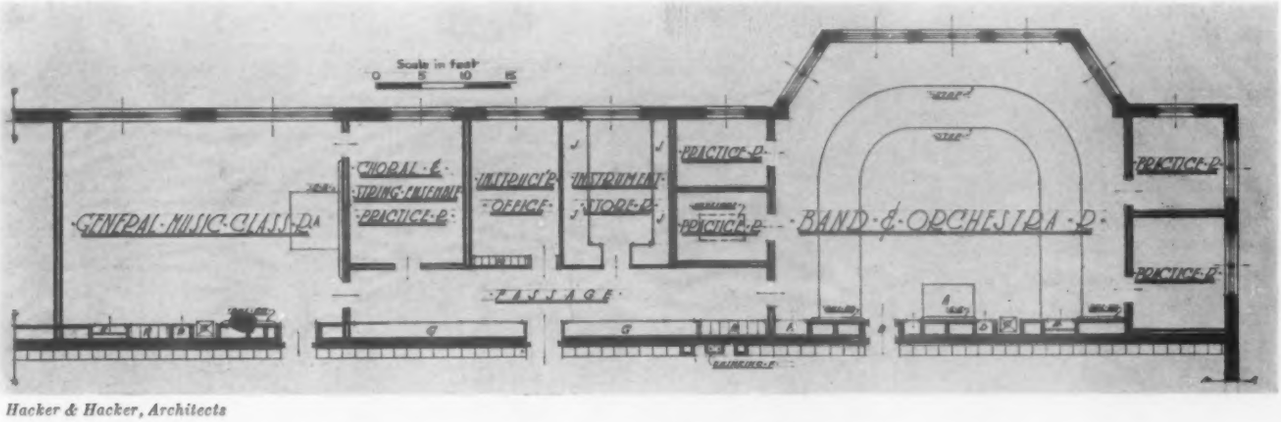
Reproduced herewith are suggested layouts for some departments of a junior high school, including the art department, the music department and the oral English room.

Also reproduced are photographs of the oral English room, library, and music room in the Junior High School at Teaneck, N. J.

These suggested layouts are for a fairly large school and would be modified for small high schools and varied according to the emphasis placed on the particular activity and the size of the enrolment.

Funds for public education and buildings, whether financed entirely by the school district or in part by state or Federal aid, in the final analysis are raised by taxes.

More than ever the educator and the school architect must recognize the trust imposed by the public to use these funds, not for experimental and extravagant educational palaces filled with ethereal and expensive non-essentials, but to produce buildings of real architectural merit, sound in functional planning, high in utilization, and with attractive classroom environment that will inspire and assist the student in his preparation for life.



Hacker & Hacker, Architects

Design for a music department for junior high-school use

LEGEND

A	Movable platform	D	Phonograph record cabinet	H	Music cabinet with shelves and indexed box files
B	Double soundproof doors	E	Bookcase	J	Instrument storage racks
B. B	Blackboard	F	Music cabinet	Bul. BD	Bulletin board with metal files under
C	Phonograph	G	Cedar uniform cabinets		

INSTALLING THE SCHOOL RADIO

By FRANCIS R. SCHERER

Architect; Superintendent of School Buildings, Rochester, N. Y.

THE use of radio in schools appears to be increasing. Provisions made for it in public school systems vary all the way from a complete broadcasting studio with equipment, licensed wave length, receivers, etc., in some large systems to the single portable radio receiver found in some of the smaller school districts.

Although school administrators are uncertain as to the part radio will play in the educational processes of tomorrow, there is a considerable weight of opinion that, in the construction of new buildings, provision should be made for future economical installation of radio equipment. This means provision of all necessary conduit systems into which the distribution wires may later be run, and of adequate anchorage of terminals for the antenna and ground connections. If studio broadcasting is to be done in a school system, it is desirable to bring into consultation experts having a satisfactory background of experience in fitting-up broadcasting studios and control apparatus.

Single- or Double-Channel Equipment

One type of equipment popular today in larger schools is the central radio unit in which the control apparatus is installed at a central point and loudspeakers are distributed in the various rooms throughout the building. If such units are of the single-channel type, only one program can be distributed throughout the building at one time. If, on the other hand, the unit is of the two-channel type, two programs may be distributed at one time, but obviously only one program at a time for each speaker. Systems may be of the one-way type, which means that the rooms in which receivers are placed can hear only that which is sent from the central unit; or they may be of the two-way type, by which messages can be sent from the room back to the central unit. Some schools make use of the two-way system for the purpose of remote supervision of the work going on in the classrooms.

The Central Radio Unit

The central radio unit requires someone to operate it, tuning in the program and manipulating the station switches for reception at certain loudspeakers in accordance with a predetermined schedule. Usually this task is a function of the principal, the school clerk, or one of the administrative group. The manipulation, however, does not require the full-time attendance of a person, the usual procedure being for the station to be brought in at the proper volume, as determined by a monitor speaker located at the central unit. When reception and tone are correct, the person operating the central unit throws the switches so as to divert the program to the particular rooms scheduled to receive it.

Such a program would occupy one of the channels in a two-channel system, leaving the other channel free for reception from another outside station, for internal broadcasts, messages, paging, or phonograph records. The central system could also be made to provide for the broadcasting of assembly hall programs to any of the loudspeakers in the building through the use of either one of the two channels. In addition, such equipment furnishes the pupils an opportunity to practice broadcasting.

There will be no special problem in providing for the installation of a central radio unit at the time of the construction of a building. Since we may reasonably expect the life of a building to extend beyond the life of the radio equipment, it would seem desirable to install a conduit system for the distribution of the lines throughout the building, thus permitting later installation of wiring and equipment or their replacement with ease and low cost when obsolescence or wear dictates the abandonment of the older equipment. The conduit system should provide an outlet for a loudspeaker in each instructional room, whether or not the initial installation provides for the speaker.

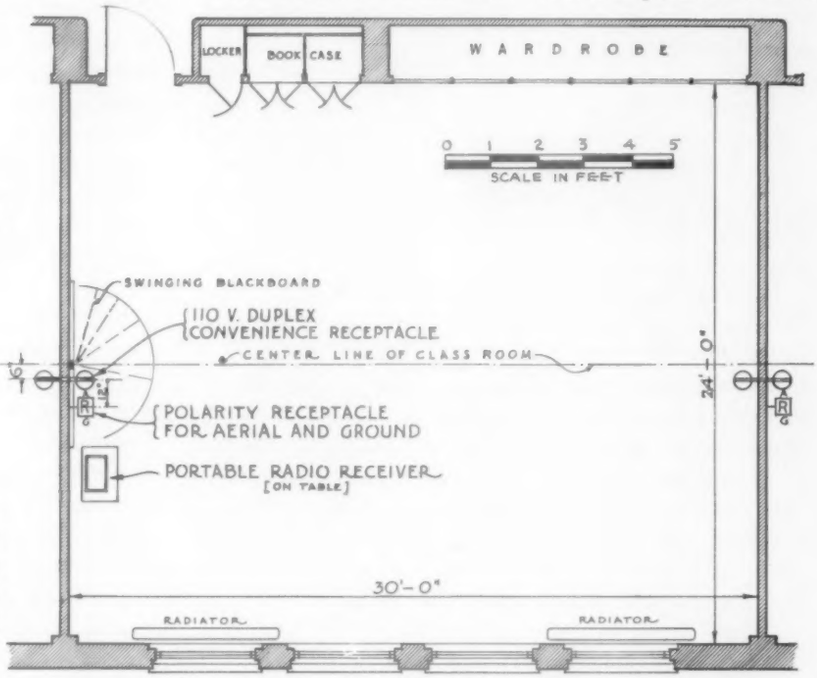
Fixed or Portable Radios in Classrooms

Contrasted with the central radio equipment is the more modest provision of installing a radio receiver in one or more classrooms in the building. This permits teacher control for the reception of such programs as may be approved by the head of the school. In some schools where space is available, a separate room is set aside for radio and visual education. Here the equipment is fixed and the groups are taken to the room by the teachers at stated intervals for scheduled broadcasts. Contrasted with this is the currently popular method of installing a portable radio in the various rooms where classes are programmed for radio time. This arrangement seems to be favored by many elementary schools, since it avoids shifting of classes, makes for continuity of schedule, and reduces lost time.

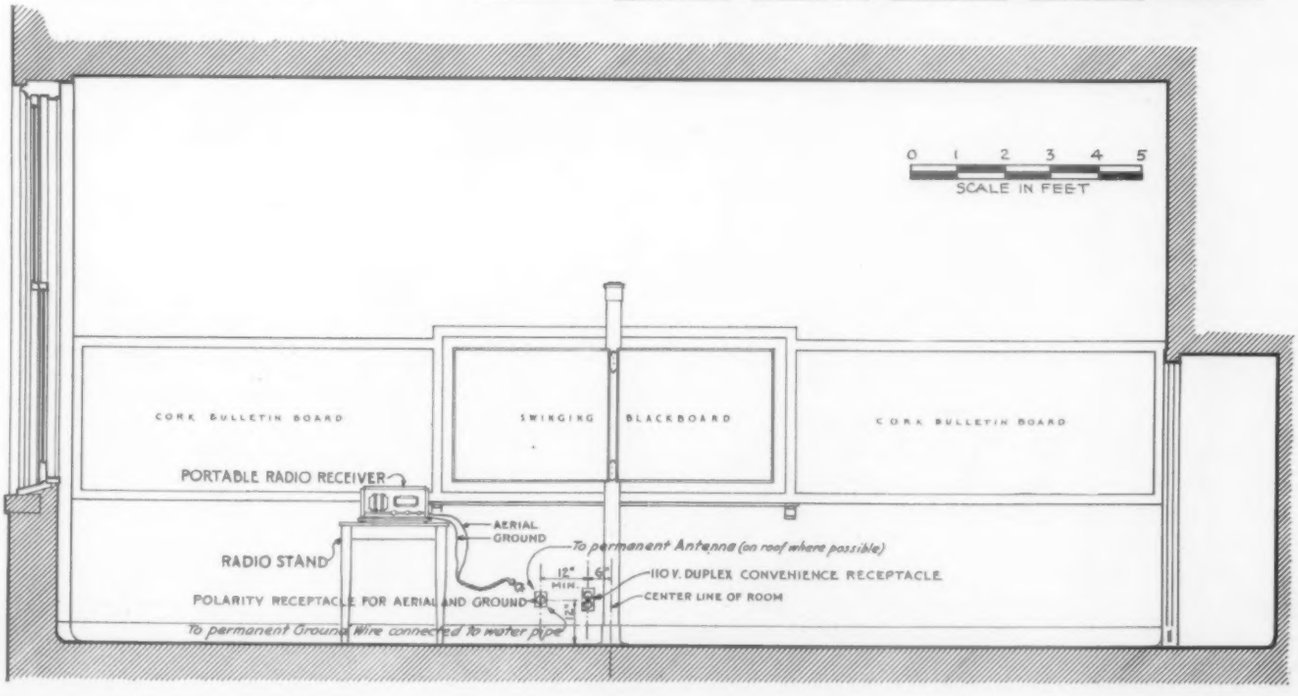
To Obtain Good Reception

Since the introduction of radio as a medium of instruction, there has been considerable experimenting to overcome the difficulties in existing buildings so as to obtain good reception. Usually, good reception is assured when a suitable antenna is provided and the radio receiver is grounded. The antenna may be placed inside the classroom if it is not desired to receive broadcasts beyond the local stations. For a greater range it becomes desirable to have an outside antenna which should be provided with a lightning arrestor and, where possible, grounded to a water pipe. Where short-wave reception is desired, this outdoor antenna should be of the doublet type.

Where electric service is available, the radio in the classroom should be plugged into a 110-v receptacle preferably located in the front wall of the room. The antenna should terminate in a polarized receptacle located nearby the 110-v receptacle. In this polarized receptacle would also terminate the ground, which in turn would be connected to an adjacent steam or water pipe. A satisfactory arrangement has been to locate these two receptacles near the center of the front wall a few inches above the floor. It is then possible to have



Right—Plan of a classroom. Note the location of the receptacles and outlets at the front and rear of room



Below—Front elevation of the same classroom. Note the relative positions of the receptacles and radio connectors. While this sketch indicates the radio receiver resting on a small table in the front of the room, a newer plan is now under experiment whereby the space between the swinging board and the outside wall, below the cork bulletin board, is provided with open shelving about 10 inches deep. The radio receiver will rest on the top of that shelving

two 110-v receptacles on the same circuit; there being, in addition to the one in the front of the room for radio reception, another connected to the same wires but opening into the rear of the adjoining room, to be used for the connection of the projectors for motion pictures and slides.

In the majority of locations, radios are operated from 110-v AC, single-phase electric supply outlets. Where buildings are supplied with only DC service, it will be necessary to provide special receivers. In these cases it will be advisable to filter out special noises caused by commutation of motors, because the arcing of the brushes on the commutators produces a peculiar static condition.

Pupils will occasionally attempt to force the aerial and ground plug into the 110-v receptacle. To prevent accidents from such abuse, it is desirable to equip the radio receiver with a small condenser ahead of the antenna coil. Such an arrangement costs about 50 cents and affords considerable protection against the burning-out of antenna coils in the radio receiver.

Even though the radio receivers are installed with the aforementioned antenna and ground connections, there may be instances of interference which will make reception unsatisfactory. Most frequently the causes of this interference will be found to result from conditions within the school building itself, due to such things as motor generators, refrigerators, motion picture projectors, carbon arcs, welding units, and the like. A radio repair man can search these out and, as a rule, eliminate them. In instances where poor reception is due to conditions outside the school building itself, it may become necessary to install wave traps at the receiver.

As a rule, radios of the miniature size will not prove satisfactory, because they lack fidelity of tone. The larger radios in the table model may be obtained with speakers of correct design to minimize distortion, yet easily transportable from one classroom to another. The arrangement whereby one plug is used for the 110-v service and another for the antenna and ground receptacle makes for simplicity and flexibility where the radio budget is not sufficient to provide a separate radio or loudspeaker in each room.

Incorporate Provision for Radio in the Initial Building Plan

In planning new school buildings, radio installation should receive proper attention whether it is contemplated to make immediate installation of the equipment or not. Since most buildings today are constructed with concrete floors, the cost of later installation of outlets may be so prohibitive as to defer indefinitely the actual procurement of the radio equipment. It is the judgment of schoolhouse planners, reflected by the National Council on Schoolhouse Construction, that the original construction should provide for the eventual installation of adequate radio reception in each instructional room. The cost of such provision at the time of construction is relatively low, since it covers only the 110-v receptacle wired for use and the polarity receptacle with its conduits ready for the subsequent installation of the antenna and ground connections. Provision should also be made for the proper support and anchorages for the antenna to be installed later. When this is incorporated into the initial design of the building, much can be done to get rid of the back-yard-clothesline effect that some subsequent antenna installations give to a building.

PLANNING ROOMS FOR MUSIC DEPARTMENTS IN SECONDARY SCHOOLS AND COLLEGES

By CHARLES J. LAMP

Supervisor of Music, San Francisco Public Schools

FOR efficient and proper planning of music rooms for secondary schools and colleges, due consideration must be given to each of the following factors:

1. *From the standpoint of the administration of the school as a whole*
   (a) Accessibility of instrumental equipment to main school auditorium
   (b) Economic provisions for soundproofing or sound isolation
2. *From the standpoint of the administration of the music department as to details of construction of music rooms conducive to efficiency*
   (a) General grouping of music rooms conducive to efficient departmental supervision
   (b) Music teachers' workroom and music library, conveniently located with reference to music rooms
   (c) Instrumental rehearsal hall of a size that not only will provide the seating space required for large bands and orchestras, but will simultaneously permit optimum acoustic treatment
   (d) Seating arrangements in the rehearsal hall which permit its occasional use for rehearsing combined choruses for special events, the reception of special radio broadcasts of educational import, recitals, etc.
   (e) Economic and effective instrument practice room supervision
3. *From the standpoint of teacher supervision of storage of instrumental equipment, and its accessibility by the students using it*
   (a) Lockers for school-owned instruments
   (b) Lockers for student-owned instruments
   (c) Lockers for uniforms
   (d) Dressing rooms for band members
4. *From the standpoint of the administration of the instrumental rehearsal hall for occasional use for after-school student and community activities and as a little theater*
   (a) Location of the instrumental rehearsal hall with reference to the main building, suitable to permit above-mentioned usage and yet be an independent complete unit
   (b) Stage entrance for delivery of rented scenery, costumes, etc., other than main entrance or corridors
5. *From the standpoint of size*
   (a) Enrolment of school
   (b) Scope and popularity of music courses
   (c) Type of community
   (d) Class size standards; that is, minimum and maximum as a factor in determining methods of instrumental instruction—individual versus group and, if the latter, homogeneous versus heterogeneous
   (e) Expansion yet retention of all aforementioned advantages
   (f) Adaptability of plan as outlined to schools requiring less space for music work because of smaller enrolment or any other reasons

General Administration Factors

1. (a)—The school band, glee clubs and orchestras play quite an important role in the various student body assemblies, concerts, dramas, etc., held in the auditoriums of the modern school. Obviously, the instrumental equipment should be stored as near to the auditorium as possible. Lack of such consideration will occasion one of the following uneconomic procedures:

   (1) Transportation of orchestra chairs, music stands and expensive delicate equipment up or down stairs, through corridors (often crowded), plus the reverse process at close of function. This requires time which must be planned for by the administrator and sacrificed from other studies if the labor is done by students. To avoid this waste of effort and insure promptness in conduct of programs in poorly planned schools (from the standpoint of accessibility), the only alternative is:
   (2) Duplicate chairs, stands and equipment, likewise wasteful.

The plan presented herewith provides the desired accessibility between music rooms and auditorium, for they are adjoining. The space labeled "passage" connects the instrumental rehearsal hall with the main auditorium, as do also the doors from both stages to the stage entrance lobby. Both stages are on the same level to facilitate joint usage of piano and other heavy, expensive equipment, eliminating duplication.

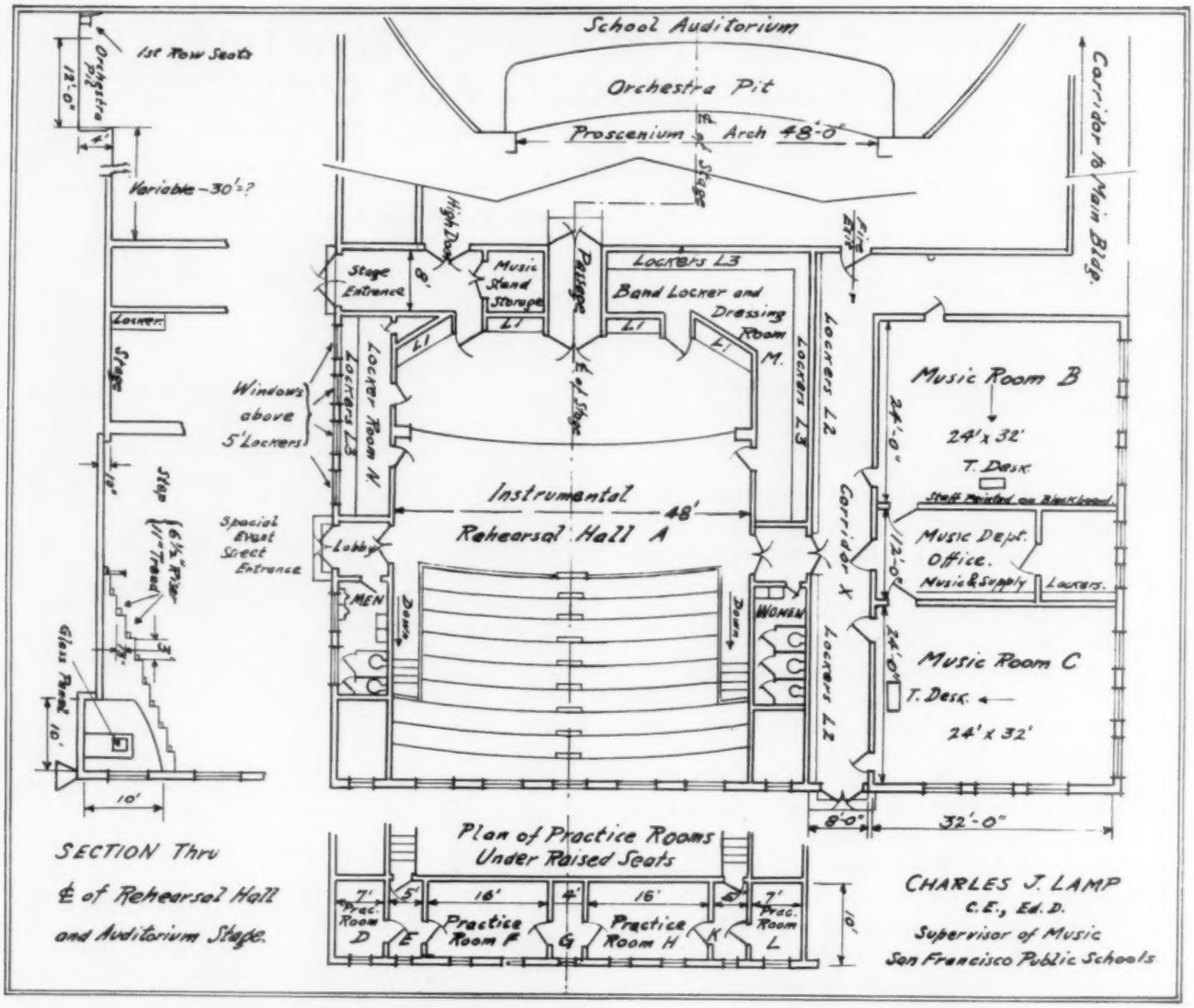


Fig. 1—A suggested plan of music rooms for high schools and colleges

1. (b)—The recent idea of placing the main auditorium to one side of the main academic building permits an opportunity for locating music rooms where the sound made by the music classes will not cause disturbances to other departments. Rehearsal hall A, the place designed to house the larger instrumental groups, is located in the corner farthest from the academic building. Room B, closest to the academic building, is planned to house music courses of the academic type—Harmony, History of Music, etc.

The possibility of disturbance of each of the music rooms by the others in the music department is eliminated by what may be termed "sound isolation." The music department office serves as a sound isolator between room B and room C. Corridor X, band locker room M and the women's toilet serve as sound isolators between rehearsal hall A and rooms B and C. Lobbies E and K plus storage room G serve as sound isolators between practice rooms D, F, H and L, whereas the stage entrance lobby, the music stand storage, plus band locker room M, jointly serve to isolate sounds from rehearsal hall A and the main auditorium. Note: This isolation has been most economically taken care of, eliminating as it does all double walls and doors and their cost.*

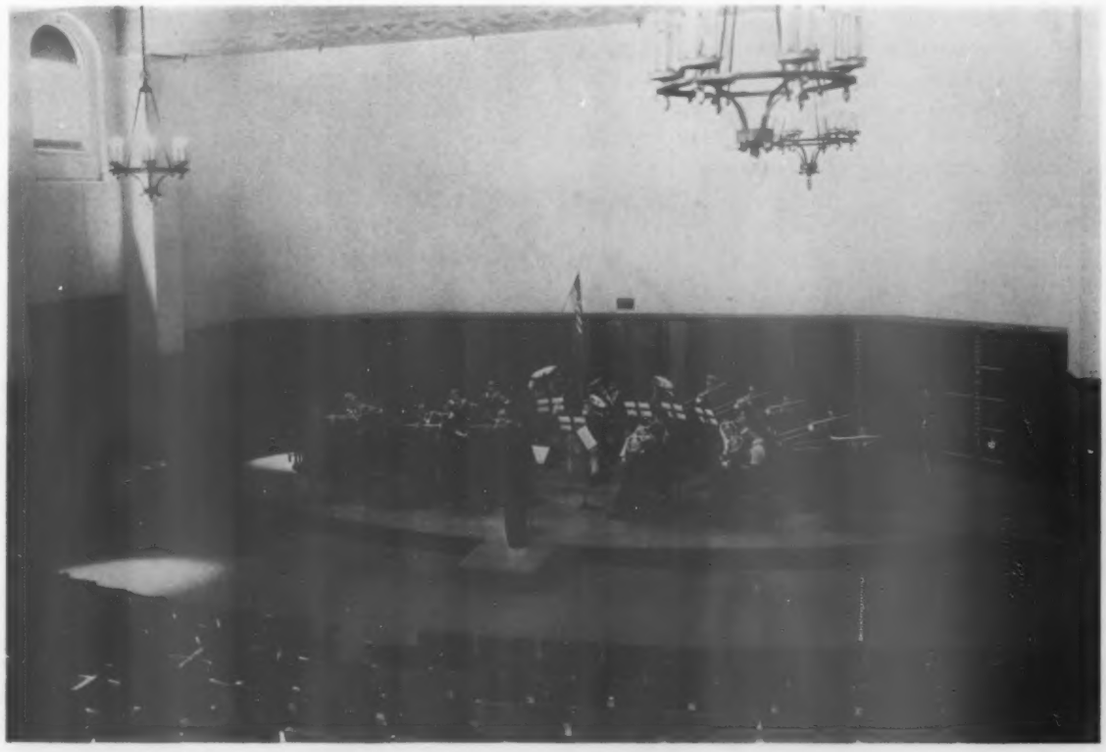
Music Department Administration Factors

2. (a)—The general layout of rooms in this plan centers around the music department office as far as dimensions of rooms permit. The accessibility of each room to the office, and vice versa, is conducive to economic and efficient departmental supervision.

2. (b)—The office is intended to serve as a music teachers' workroom during their free periods, getting away from the old uneconomic plan of a room per

* Compare with Donovan: "School Architecture," pages 342 to 349.

Fig. 2 above and Fig. 3 below are interior views of rehearsal hall similar to room A shown in plan, Fig. 1 opposite. These illustrate flexibility of this plan in meeting space requirements for ensemble groups, varying in size. Fig. 2 illustrates utilization of floor and stage for meeting space requirements for seating a symphonic group of 78 players. Fig. 3 illustrates utilization of stage alone for smaller groups; that is, a brass class of 21 players.



teacher. Its central location affords maximum convenience to the music teachers.

2. (c)—The Music Supervisors National Conference Standard Instrumentation for Symphonic Band includes 74 or more players, that for Symphony Orchestra includes 78 (plus harp if called for in score). A space not less than 46 feet wide and 26 feet deep is required to seat either of these organizations. In order to utilize the floor space of the stage, the latter is built only 10 inches higher than the main floor. A seating arrangement meeting the needs of either of these organizations is shown in Fig. 2. Forty of the players are seated on the main floor, 38 others being seated on the stage. The players farthest from the conductor's podium are thereby slightly elevated, a most desirable situation. (Note: The piano shown in Fig. 2 is used in lieu of a harp because of the scarcity of players of the latter instrument.)

In this connection it should be remembered that each musical instrument is in reality a sound amplifier. Obviously, if the size of the instrumental rehearsal hall were limited to that of the floor area requisite for seating the larger band and orchestral groups, a sound-absorbent material with a relatively high coefficient would have to be used on the walls and ceiling to cut down the resultant excessive reverberation. The amount of acoustical treatment requisite for the larger groups might prove excessive for effective use by smaller ensembles such as a beginners' brass class (See Fig. 3), a beginners' woodwind class (Fig. 4), and, particularly, a beginners' string class (Fig. 5). Any designer versed in acoustics may note from either Sabine's or Eyring's formulae that the reverberation time of a room varies directly with its volume. In the language of the layman this amounts to saying that increasing the size of the instrumental hall cuts down the amount of acoustic material needed for making it usable for the larger groups; this in turn makes the hall all the more effective for smaller groups.

Obviously, the designer must be conversant with the size of both the largest and smallest groups for which the rehearsal hall is being planned, in order to calculate the most effective size and acoustical treatment to secure optimum results; that is, a hall ideal for all music groups.

2. (d)—For larger choral ensembles, each row of seats provided is 13 inches higher in elevation than the adjoining row ahead. The reason for this difference is to permit the director to see the mouths of the singers (as well as the eyes) in order to permit immediate location of an erring singer. Rows are 3 feet apart, instead of the usual 2 feet 8 inches, to facilitate ready change of position of singers, standing to sitting and vice versa, and to permit the holding of music in the proper position.

The requirements for a large room for radio broadcasts of symphonic music and other educational topics are also fulfilled in rehearsal hall A.

2. (e)—Economic and effective supervision of practice rooms is provided by centering all connecting doors on a straight line; secondly, by providing a glass panel in these doors. For details see Fig. 1.

Equipment Lockers and Dressing-Room Facilities

3. (a)—Lockers for the various school-owned instruments (L 1) are placed on the back wall of the stage in rehearsal hall A at positions near that occupied by players of the particular instruments. Note in Fig. 3 that doors to lockers for instruments in the group are open to show the varying interior construction. The locker for trumpets is on the instructor's left, adjacent to the trumpet players; the locker for the trombones is on the instructor's right adjacent to the trombone players; the lockers for melophones and E♭ tubas are on the extreme right, and the lockers for the baritones and BB♭ tuba are on the extreme left. In Fig. 5 the violin locker is on the extreme left; the string bass lockers (one for each instrument) are placed directly behind the players of the instruments; the cello lockers are to the right of passage door No. 173, just behind the cello players. The viola locker is on the extreme right behind the curtain on the right.

This arrangement permits ready pick-up and return of these instruments by the different students using each instrument during successive periods of the school day, minimizes accidental injury while moving equipment, and reduces teacher supervision of this procedure to a minimum; the equipment being always within view of the teacher using the rehearsal hall during any particular class session.

3. (b)—As the regulation student hall locker is just large enough to provide for book and clothing requirements of the individual pupil, and as the needs of the music student in these two instances equal those of any other, lockers for student-owned instruments must also be provided. The location of such lockers in relation to the rehearsal room is a vital factor in affording maximum class performance within the allotted school period. Music ensemble differs from all other school work in that it is group performance; hence, each extra minute required to bring the last instrument in place from a far-removed locker means not alone the loss of that time to the player in question, but also a loss to every member of class each day. For this reason, the lockers (L 2) for the student-owned orchestral instruments are placed in corridor X, this being the most direct traffic line from the main building to rehearsal hall A; hence, handy for students upon arrival or departure from school by being close to exit to street. The stu-

In Fig. 5, below, the doors of the string instrument lockers on the back of the stage are open to reveal their interior construction. Fig. 4, above, shows the doors closed, illustrating the appearance of the stage when used as a little theater, and for such other after-school student and community activities as are mentioned on the last page of this article

dent-owned band instruments are placed in lockers (L 3).

3. (c)—As all school bands are equipped with uniforms, lockers must be provided for their storage. The only alternative is that of compelling the band members to keep in uniform throughout the school day, which would subject the uniforms to unnecessary wear, particularly in the cases of students taking shop or science laboratory courses. Three other advantages of lockers for the uniforms, if designed to permit the use of coat hangers, are: (1) appearance, always pressed; (2) accessibility, always kept in school ready for wear on five minutes' notice from the administrator; (3) a disciplinary agent, through which to teach care of clothing, and instill care of public property. These lockers should be designed to hold both uniforms and student-owned band instruments.

3. (d)—The room in which the aforementioned lockers are placed should be adjacent to the main auditorium and rehearsal hall and of sufficient size to serve as a dressing room for the members of the band; the larger locker room M being assigned to the boys, locker room N to the girls. This provision permits the players to put on uniforms, either R.O.T.C. or school, immediately on notice. These rooms may also be used as dressing rooms for performances given in either the main auditorium or the rehearsal hall.

Rehearsal Hall a Separate Unit

4. (a)—In order that the instrumental rehearsal hall may meet the requirements of a Little Theater, the following provisions have been made:

1. Double doors leading into corridor X, lockable.
2. Separate entrance provided. (See lobby adjacent to room N.)
3. Toilets, independent of main building. The number of fixtures shown on the plan are in accord with the results of a study of the minimum number needed for peak load made by L. L. Standley (assuming maximum capacity of 200 of each sex). Mirrors, book racks and clothes hooks also required.
4. Storage space for music stands and drums. (All other instruments in their respective lockers.)
5. Chairs for band and orchestra rehearsals to be used as seats for audience (in addition to seats on raised portion).

4. (b)—A stage entrance is provided to eliminate interruptions of music classes occasioned by the delivery of scenery, costumes, furniture, etc., on the three or four days preceding and following functions in either the main auditorium or the rehearsal hall. This plan provides but one stage entrance, jointly usable by room A and the auditorium. The doors at the stage entrance and from the stage entrance lobby to the main auditorium stage to be especially designed to provide both a high opening for delivery of wide scenery, and normal opening, that is, tall jamb, doors split at 6 feet 8 inches height. All deliveries are unobserved by students in classes by reason of stage entrance location.

Adaptability of Plan to Size of School

5. (a)—The plan presented herewith is designed to meet the requirements of a high school with an enrolment of approximately 2,000, in a city system offering only such music courses as maintain an enrolment of 20 or more pupils. In smaller rural communities the minimum class size is often lowered to 10 or even less. Obviously, because of these minimum standards as to class size, individual instruction is supplanted by group methods of instrumental instruction. The result in San Francisco over a period of thirteen years has shown the homogeneous group method to be as effective for beginners as the individual—in fact, more so if a controlled exposure is used as a method of determining relative brass, woodwind or string aptitude.* Brass, woodwind and string groups of this type are shown in Figs. 3, 4, and 5, respectively.

The numerous ways of altering Fig. 1 to meet the various needs as to size and yet attain all the desirable features of this plan are too numerous to describe within the limits of this article. The following, being easily visualized, suffices to show the adaptability of the plan to varying requirements as to size. Provision for growth of the Music Department as well as to meet the present needs of a school having an enrolment in excess of 2,500 may be met by increasing size of columns in walls of rooms B and C sufficiently to carry a second story containing two more similar units. If this be done, corridor X would have to be widened to provide space for stairs and also accommodate increase in traffic due to the upper two rooms. In the latter case, hollow brick should be substituted for concrete at anticipated future stair openings.

For smaller schools the author recommends keeping the plan intact because of the sound-isolation features, using room B for subjects other than music which are aided by accessibility to the school auditorium; namely, oral expression, drama, public speaking, etc.

In the case of small rural high schools enrolling 250 or less, certain of the aforementioned features could be incorporated into the plan of the main auditorium, letting the latter serve as an instrumental

* Lamp, Charles J.: "The Determination of Aptitude for Specific Musical Instruments." Unpublished doctoral dissertation procurable from University of California Library.

Lamp and Keys: "Can Aptitude for Specific Musical Instruments Be Determined?" *The Journal of Educational Psychology*, Vol. XXVI, No. 8, November, 1935, p. 595.

rehearsal hall for the larger groups when not used for school assemblies. The use of the auditorium for instrumental music instruction is not recommended for larger schools. Whenever the auditorium stage has to be set preparatory to rallies, dramas and other functions, the music instruction suffers. This is not only a waste of students' time but a source of excessive heat and light costs.

Additional Conveniences Aiding Administration Provided for by This Plan

(1) A meeting place large enough for the senior class during weekly activity periods.
(2) A rehearsal room (other than main auditorium) for joint rehearsals of orchestra and chorus.
(3) A meeting place large enough to hold faculty meetings in schools that have a faculty larger in number than the seating capacity of ordinary classrooms.
(4) Meeting place for P.T.A., other departments of the school, and neighborhood organizations after school hours and evenings. The provisions listed under 4 (a) on the preceding page make this possible, the rehearsal hall being an independent unit with relation to the rest of the school plant.

Details Relative to Orchestra Pit in Main Auditorium

The use of the orchestra pit by Wagner was for the purpose of hiding the musicians from the audience so that violin bows moving up and down would not detract from the pictures portrayed in his operas. To satisfy theatrical customs, every school architect feels that he would be guilty of a misdemeanor if he didn't bury the school band. The attitude of the school towards the school band and orchestra is exactly the opposite of Wagner's towards the theater orchestra. The student body wants to see as well as hear its band and orchestra, since they are student organizations and therefore a part of the student body.

The student musician's point of view must also be considered; he gladly contributes his talent but feels that he has also the right of seeing the speakers on the stage. In fact, the opposition of student performers to being buried in orchestra pits built in three San Francisco high schools prior to the development of the author's plan was sufficient to occasion the flooring-over of the pits, raising the bottom of the latter to the level of the floor of the first row of orchestral seats. Fig. 1 includes a floor plan and section of an ideal school orchestra pit, which is really not a pit but an elevation below the stage equal to the average height of the student's eyes above the floor when the student is seated in a regulation 18-inch chair, that is, approximately 4 feet.

Final Check Regarding Sound Conduction

After all construction plans have been completed, they should be checked to determine possible sound-conducting mediums. The importance of checking the heating system from this standpoint is paramount. Errors of this type in two recently completed structures occasioned the subsequent consultation of the author for their correction, the estimated cost of which ran well into four figures. These expenditures could have been saved if the designer of these particular rooms had made the aforementioned check prior to commencement of construction. Furthermore, it is hard to eradicate completely errors of this type once they are made.

PLANNING THE JUNIOR COLLEGE LIBRARY

By CECIL D. HARDESTY

Acting Superintendent of Schools, Montebello, Calif.

A STUDY of the problems involved in planning a library leads one to the conclusion that it is primarily a matter of choosing which of various desirable features are preferable. For example, natural lighting is desirable, as is bookshelving space along the walls. If bookshelves are installed to a desirable height, this reduces the amount of space available for windows, and vice versa. Both good light-reflection values and acoustical properties in the ceiling are desirable, but the factors which contribute to one tend to detract from the other.

It is desirable to obtain careful control of the traffic to and from the library. At the same time, adequate exits are necessary for proper fire protection. Provision of one makes the other difficult. These and many other problems must be considered and relative needs and values weighed, in order that the library may ultimately be developed with as many desirable features as possible under the existing conditions.

This article does not attempt to give all the answers on problems involved in planning a junior college library. It does attempt to point out given areas for thinking and to suggest some of the specific problems to be solved.

The Function of the School in Relation to the Library

Since the material in the library determines to a large extent the actual available content for the curriculum, detailed planning of the material in the library cannot be done until the function of the school has been stated definitely. After the general aims and the accepted responsibilities of the school have been stated, they must in turn be re-stated in terms of the curricular offerings which the school is to present. Curricular offerings must be still further detailed in terms of course outlines, syllabi, etc., which present detailed reading lists showing reference sources, magazines, books, and other material which must be available in the library if students can obtain a real exposure to the educational program which is suggested by the accepted stated functions of the institution.

The Relation of the Library to Classroom Procedures

The techniques which are developed for the use of class time and for the use of the library determine largely the physical needs in a junior college library plant. Traditionally, the library books are kept in the library, and students go to the library to check out the books or to read them. Under this plan the library is used by students only in out-of-class hours.

Other procedures have been developed in recent years. One is to take classes to the library, where the entire class spends the class period using the library materials, or to provide one or more rooms adjoining the library or as a part of the library unit to which an entire class may go. Under this sort of set-up, social studies books, for example, or the books used in English Literature courses, might all be shelved in such a classroom unit, and the use of the room would be arranged for or scheduled with the librarian by the teachers of the individual classes. Another plan is to take the library to the classroom by having book-carts, so that a teacher may submit to the library in advance of a class period a list of books which the teacher would like to have in the classroom during a particular class period. The library prepares these books during the preceding period, so that they may be wheeled on the truck to the classroom. At the end of the period they are returned to the library. A third procedure that is being developed, particularly in high schools, is to set up a classroom library, checking out from the central library to a particular teacher or classroom a large number of books which are left in the classroom for a quarter, a semester, or even a school year. This may necessitate provision of more duplicate copies of some books than would be necessary under traditional practices.

The worth of any of these plans is determined by the extent of the use of books under the plan. While the plans suggested are in use in junior colleges, a study of current practices does not indicate that these various procedures, particularly the last two, are used extensively on the junior college level. These and other classroom and library techniques should be given consideration, however, at the time that the junior college is planned, so that facilities will be available for whatever program is adopted.

Library Personnel

The number of persons to be employed in a library, the nature of the duties they are to perform, and the most efficient and effective location in the library unit from which they may function, should be considered at the time a library is planned. A charging

desk must be provided at or near an exit, so that some control can be exercised over the library books. Presumably this work will be performed by a library clerk or students. There should be a librarian's office where the trained librarian can carry on much of her work. Mechanical work in connection with receiving and cataloging of books, book repair, etc., should be performed in a library workroom located in an out-of-the-way corner.

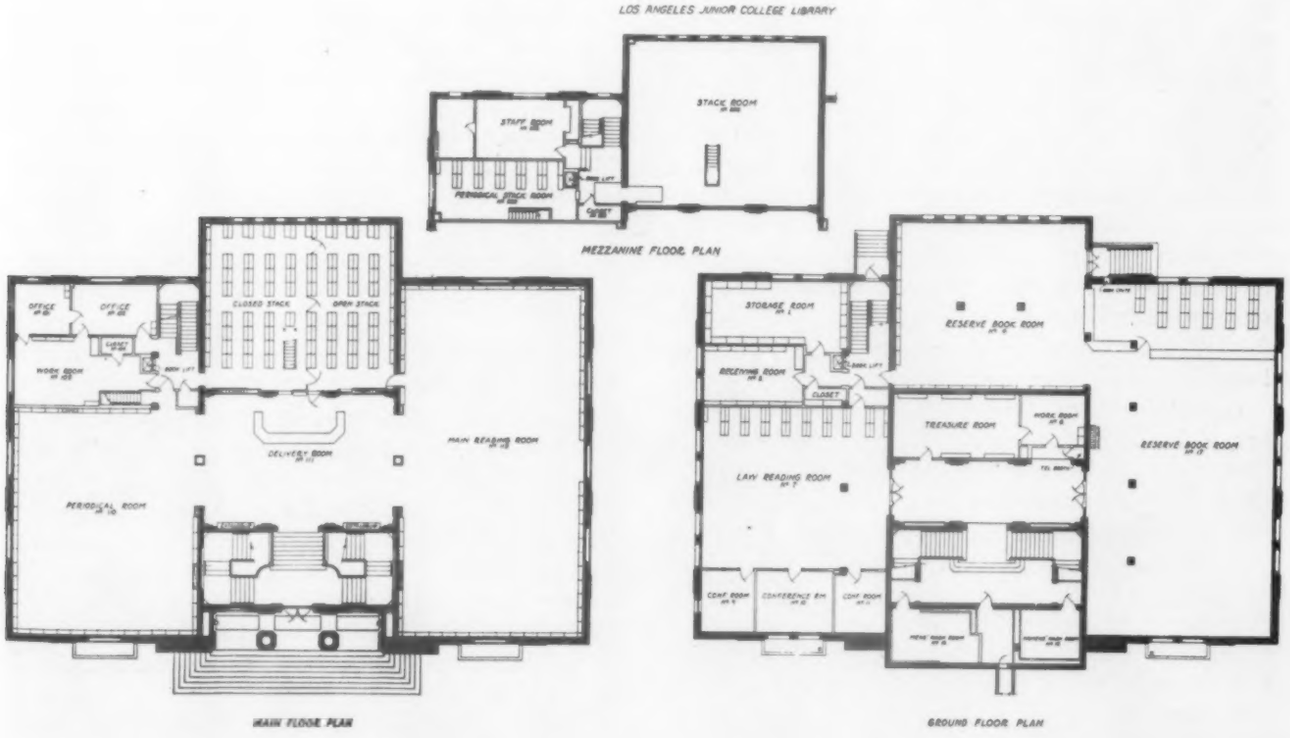
Location of the Library

The library should be in the center of the school. This is true from the point of view of the educational program and should be true from a physical standpoint. After all, an educational program of a school can be little better than the school's library. This means that there must be an adequate quantity of library material of the best quality; but provision of library facilities on some top floor or at some remote corner of the campus does not encourage students to go to the library. Ideally, the library should be located just off a main traveled thoroughfare so that all the student body will have occasion at one or more times during the day to pass by. This will encourage a use of library facilities. Whether the library is to be in a wing of a building, or on one or both sides of a corridor, or in a building by itself, is a matter of planning to secure the most effective use of the available school site. It is a problem that must be studied carefully by the school administration and the architect.

Library Space

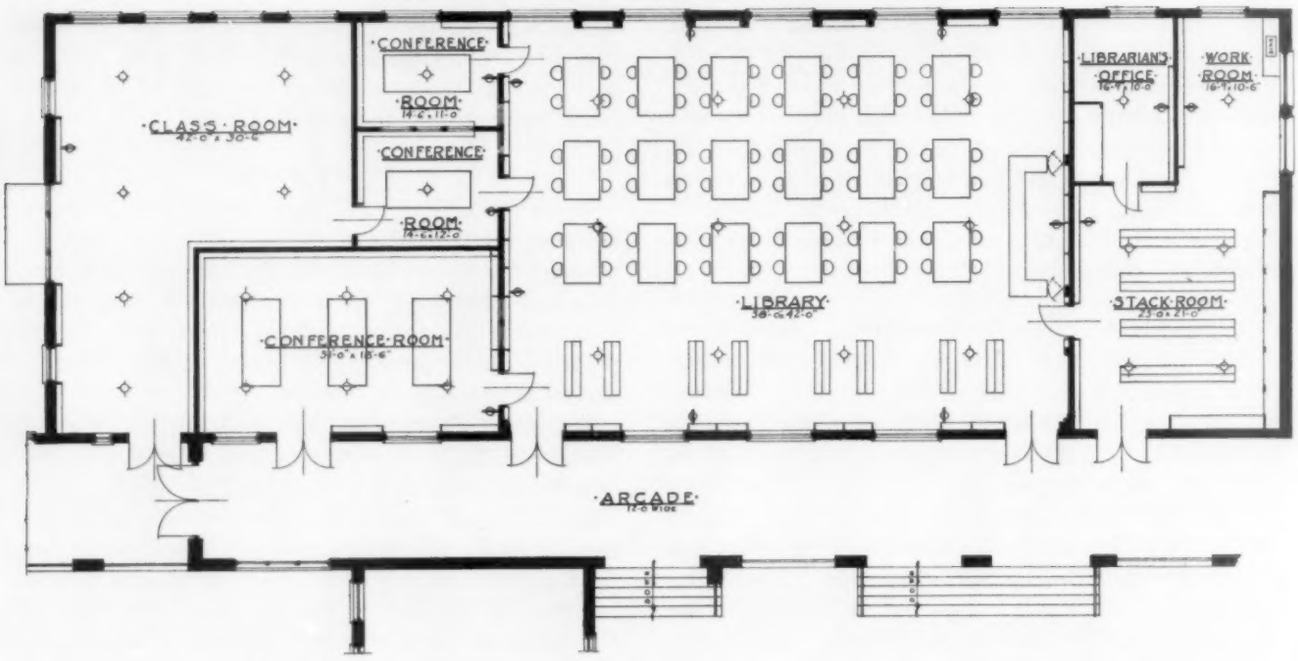
If we agree that the library grows directly out of the accepted functions of the institution, and that it is actually the center of the institution both educationally and physically, we realize that a considerable area should be devoted to library facilities. A major portion of the studying of junior college students should be done in the library.

It is the opinion of the writer that a junior college library should have seating facilities for at least one-fourth and preferably one-third of the student body. This opinion is based on personal inspection of a number of the best junior colleges in the country, and upon careful analysis of information relative to existing seating facilities in junior college libraries, with the opinions of the junior college librarians and administrators as to the adequacy of facilities provided. The seating capacity need not, and probably should not, be provided in a single room. A good library plan would include probably a reference room, a magazine room, and a general reading room, with some adjoining rooms large enough for small seminar



Courtesy California State Department of Education

Diagram 1—Floor plans of the library at Los Angeles Junior College



Edward Cray Taylor & Ellis Wing Taylor, Architects and Engineers, Los Angeles, Calif.

Diagram 2—Sketch of layout in Beverly Hills (Calif.) High School library

groups, and other rooms for still smaller committees. The Doheny Memorial Library at the University of Southern California has a number of small study rooms large enough for two to four persons in connection with stacks where books are shelved, and has also many individual cubicles or offices which are assigned to advanced students who are carrying on extensive library research. While it may not be possible to provide such adequate library facilities in a public junior college, the use given these facilities in the library mentioned convinces the author that there is a place for this type of facility. In addition to the rooms suggested above, it is frequently desirable to provide a small workroom for faculty members where their professional books are kept.

In each junior college situation there will be a number of books which are classified as "reserve," and these must be kept off the shelves that are open to the students. In some cases the number of these books will be large enough to make it necessary to have a separate stack room for them. In other cases the number may be limited and they may be kept on low shelving adjoining the charging desk.

It is rare that a well-developed junior college library has adequate space for its books on shelves along the walls. Stacks will probably have to be provided, either in a separate room or in the general reading room. The writer feels that the stacks should be either on the side or at the end of the general reading room, and that all shelving should be open to the students. While this may tend to create some confusion because students will put books back on the shelves in the wrong places, the fact that they help themselves to the books decreases the amount of library service which it is necessary to supply. Getting the students close to the books encourages the use of the books.

The floor plan of the Los Angeles Junior College library is shown in Diagram 1. This library accommodates a student body of several thousand; and, while the plan would not be practical for a library in a small institution, it suggests a number of features which should be provided in the junior college library.

Diagram 2 shows a floor plan worked out in a particular situation where it was necessary to place library facilities in a building unit which had previously been used for cafeteria purposes. The plan provides an office for the librarian, where she is fairly well secluded, a work room, a stack room, small conference rooms for committee activities, a larger conference room where it is possible to take entire classes for library study, and an adjoining room, which might be used as a study hall, a classroom, or, if there should be a need at some future date, a place for additional stacks to be provided.

The library plan should show the furniture arrangement. Location of card catalogs, special exhibit cases and charging desks can be planned to best advantage when the original layout is designed.

Lighting the Library

Securing natural light in the library presents a problem. The photograph of the library in the Wyandotte High School, Kansas City, Kans., shows walls lined with shelves up to a height which can be reached from the floor, and ample window space above the shelving. Use of venetian blinds, as shown in this picture, gives excellent control of natural light. In this case, however, it has been necessary to have a rather high ceiling, which has increased the original cost of the building and makes a greater expense for heating the library than would be necessary if the ceiling were lower and the cubic space less. While a lower ceiling would reduce the heating cost, it would undoubtedly increase the cost of artificial lighting. This illustrates the point made earlier in this article that planning the library involves choosing among desirable but conflicting features. The school policy in regard to keeping the library open in the evening may affect the amount of artificial light needed. An ideal lighting situation would provide sufficient window space for natural light under normal lighting conditions outside the building, and would also provide adequate artificial lighting so that approximately 25 foot-candle power of light would be available at the desk-top level when the room was lighted entirely by artificial light. Whether the lights are to be indirect, semi-indirect, or direct, or whether some combination shall be used, presents another situation in which acoustical treatment, reflection values of ceiling and wall colors and materials, the cost of electricity, and other factors, must each be given consideration. The important thing is to have adequate light at all times.

Acoustical Treatment of the Library

A library is a place for quiet, effective work. Floor, wall, and ceiling materials which will help to reduce reverberation of sound contribute to a desirable library atmosphere. Acoustical plaster helps to reduce noise. On the other hand, an accumulation of dust over a period of years in the openings in acoustical plaster decreases its acoustical values. Painting, when that is necessary, also decreases the acoustical values of plaster.

There are a number of acoustical materials available on the market. Some of these are perforated, and sound is killed in the openings. At the same time the openings decrease the light-reflecting values of the walls and ceilings on which they are used.

A great deal of the noise in a library comes from the scuffing of chairs, tables, and feet on the floor. This can be reduced if a soft floor material is used. A thick cork tile contributes greatly to quiet. Its

Illustration 1—Wyandotte High School library, Kansas City, Kans.

Illustration 2—Library in the Beverly Hills (Calif.) High School

porosity tends to absorb sound; however, the porosity tends to collect dirt. A cork tile floor that has not been sealed and waxed is difficult to keep clean and presents a poor appearance. If it is sealed and well waxed and polished, the floor will remain beautiful over a long period of years. Obviously, however, the use of a sealer and wax closes the pores of the tile, making it impossible for the tile to keep its original acoustical properties. Linoleum, which is made of the same materials as cork tile, is subjected in its construction to greater pressure and its surface is easier to maintain than the cork tile, but is, of course, of less acoustical value.

There are many different types of tile and other floor materials which may be used to cover a library floor. In selecting the floor covering, consideration must be given to the acoustical value of the material, the difficulty or ease with which its good appearance may be maintained, its original cost, and its probable length of life.

Furniture

The school business administrator who is confronted with the problem of selecting furniture for a library must face on the one hand the factors of low original cost, sturdiness of the equipment, and its maintenance cost, and on the other hand a traditional insistence on a particular type of furniture that distinguishes the library from the rest of the school picture.

Illustration 2 shows regular classroom furniture in use for seating facilities in the library. In this case a ply-wood top table with tubular steel standards and a steel classroom chair with a scooped saddle seat have been provided. This particular chair was built to specifications prepared by the writer and was designed to secure economy in original cost, sturdiness in construction, low maintenance cost, comfort, and at the same time the best possible posture for students.

Illustration 1, referred to above, shows a library with special tables and chairs. If there is justification for building rather elaborate furniture for a library, the question might well be raised whether it would not be justifiable to furnish the same type of furniture in classrooms.

If the library unit is well planned in advance, the architect may be able to provide built-in pamphlet files in walls that are used to carry heating ducts, etc. Every librarian knows that there is need for storage space for pamphlets and loose material, and the more adequately this can be cared for in the original planning, the better. Exhibit cases are a part of every library arrangement, and with forethought it may be possible to provide trophy cases or a trophy room or other exhibit rooms.

Conclusion

There is need for development of standards for housing the junior college library, and considerable research should be done in this field. The most important factor to be considered in planning the junior college library is, however, the function of the school, and the way in which the library is to serve as a part of the instructional program.

PLANNING THE SCHOOL STAGE

By

ALICE BARROWS and **LEE SIMONSON**

Senior Specialist in School Building Problems
U. S. Office of Education

Scenic Designer and Theater Consultant
New York City

THE planning of the stage in a school auditorium conditions the usefulness of the auditorium for either school or community use. If the stage is shallow, say 12 to 15 feet in depth, and if there is little or no offstage space, it is impossible to produce plays adequately or to use the auditorium for concerts. Therefore, the planning of the school stage is a matter of vital importance to school administrators if they are to get the full value of the large investment in auditoriums.

To plan an auditorium adequately requires the combined services of the school administrator, school principal, architect, scenic designer and lighting expert. The school officials need to outline the purposes of the auditorium and the kind of activities to be carried on in it both during the school day and for community use. The architect, scenic designer and lighting expert have the task of planning the auditorium so that these activities can be carried on most effectively and efficiently.

Purposes of the Auditorium

The purposes of the modern school auditorium are very different from those which conditioned the planning of the old school "assembly hall." Originally the assembly hall was added to the school building because, as cities developed and a large number of children had to be housed under one roof, it was considered desirable to have one central place where the principal could make announcements and where graduation exercises could be held. The assembly hall was used generally at the beginning of school for opening exercises, which lasted five or ten minutes, and then remained vacant for most of the day. This practice still obtains in many schools.

In recent years, however, the shorter working day with consequent increase of leisure time for the masses of the people has increased demands by adults for community use of the auditorium for forums, plays, concerts, and motion pictures. Furthermore, it is now recognized that the problem of use of leisure time will never be solved until people form habits in childhood of interesting and creative use of leisure. Therefore, it becomes the business of the school to provide opportunities in school for the developing in children of interests and habits in leisure-time activities which will be a source of permanent interest to them as adults. This means that school auditoriums must be planned for the production of plays, concerts, forum discussions and motion pictures for groups of children as well as for adults.

Planning the Auditorium and Stage

A school auditorium should be planned as a theater if the foregoing purposes are to be carried out effectively. Unfortunately, however, auditoriums are rarely planned or equipped with any sound knowledge of their technical requirements. The first error is usually in the size and dimensions of the auditorium. There is still a tendency among some school superintendents to plan the auditorium so that the whole school may be seated at one time. Nowadays, however, when the trend is toward the erection of high schools and elementary schools with an enrolment of 1,200 or more, the erection of an auditorium with a seating capacity of 1,200 destroys the very purposes for which the auditorium is built.

Before a stage and an auditorium can be equipped they must be fundamentally right in their dimensions and their general proportions. The common mistake is to make the auditorium far too big, the proscenium opening ridiculously wide and the stage itself impossibly shallow, because on a few occasions a year it may be traditional to have the entire school meet in a body for general assembly or graduation exercises. The resulting seating capacity of 1,500 and often 2,000 seats, besides adding an unnecessary amount of building cube cost to the total cost of the building, puts an almost impossible handicap on the use of the auditorium as a theater. Most professional theaters in New York have a capacity of 1,000 seats or slightly less. The larger houses seating 1,200 to 1,500 are invariably reserved for musical shows. Most managers avoid them for presenting plays—the plays invariably "get lost," don't "get over." Very few professional actors can project their trained voices or "get across the footlights" in a 1,500-seat auditorium.

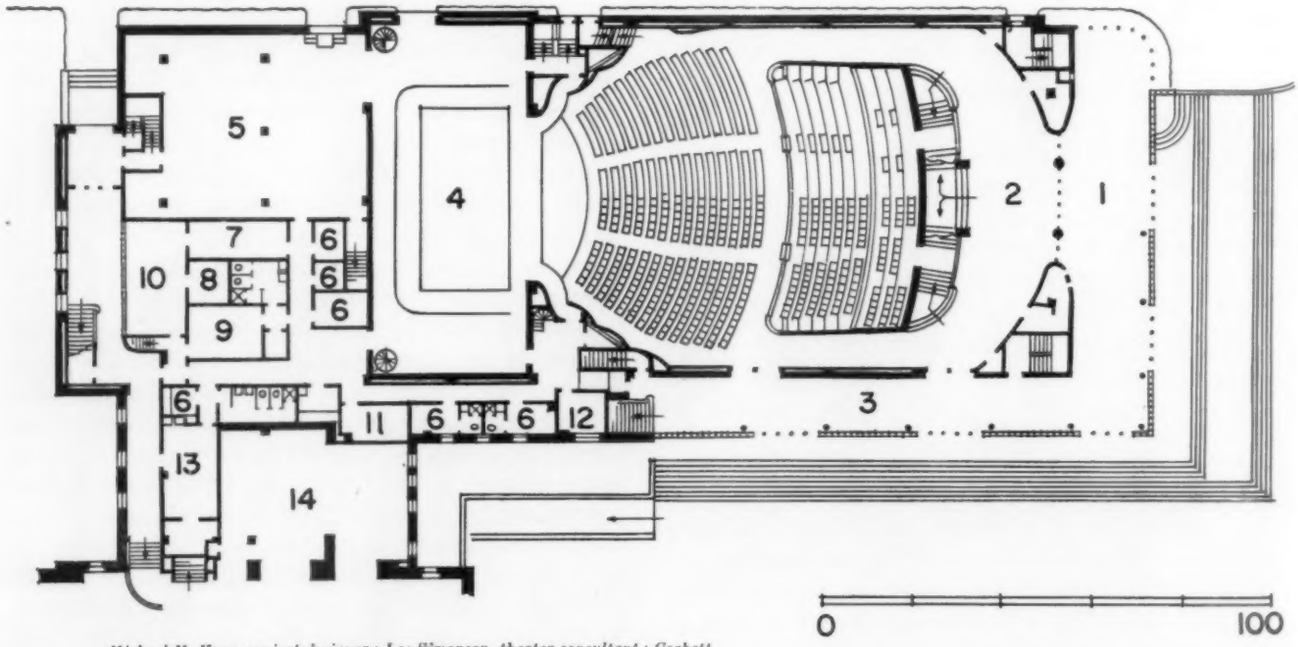
In order to get sight lines from a spread of so many seats, the proscenium is spread in turn often to 80 feet, as in one school auditorium of which we have

ED. NOTE: The material in this article will be found in greater detail in "The School Auditorium as a Theater," by Alice Barrows and Lee Simonson. U. S. Office of Education Bulletin 1939, No. 4. U. S. Government Printing Office. Price, 10 cents.

seen a photograph. This is again the height, or rather the breadth, of the ridiculous. Opera-house prosceniums are usually only 50 to 60 feet wide, partly to accommodate large choruses, partly to provide space in the orchestra pit for a full symphony orchestra. A 40-foot proscenium is used only in musical comedies in order to give space for enough chorus girls to string out in long lines while they do their conventional dance routine. The average professional production plays in a proscenium 32 to 34 feet wide. For a school auditorium, a proscenium width of 30 to 32 feet is an ample maximum, 24 feet a minimum. *The auditorium capacity should range from 500 or less to 750 in order to give the intimacy necessary to an effective theater where amateurs perform.* If for any essential reason the auditorium serves as a community center as well, and visiting soloists, lecturers, or moving pictures can fill 1,200 or 1,500 seats often enough to warrant their being installed, provision should be made in the original architectural plan for partitioning the auditorium with curtains or movable partitions so that it can be scaled down to one-half its seating capacity or less for regular use.

The advantage of keeping a proscenium opening to 30 feet is that it allows room for working space backstage and offstage. The space seen through the proscenium when the curtain is up, the space used for the acting of the play, is only part of the space needed to run the performance. The acting area of any stage should never be much more than one-third of its total area. The stage space which the public does not see when the curtain is up is as essential as the space which it does see. Even where elaborate scenery is not used, and simpler or more stylized productions are given, stacking and storage space must be provided. Ample offstage space is essential space on school stages where chorus groups are so often involved. People in little theaters are no smaller than elsewhere. The size of a chair, a sofa, or table remains standard and each occupies just as much cubic space offstage as on. Not only playing space but working space is the essential requirement.

A safe rule is that the total stage space from side wall to side wall should never be less than twice the width of the proscenium, or one-half the width of the proscenium stage right and stage left. For a proscenium opening of 30 feet the stage width will be 60 feet. The total depth of a stage should never be less than 25 feet, for the acting area then becomes too shallow. The height of the stage above the floor at the first row of seats should be 2 feet 8 inches. Under certain conditions it may be reduced to 2 feet 6 inches

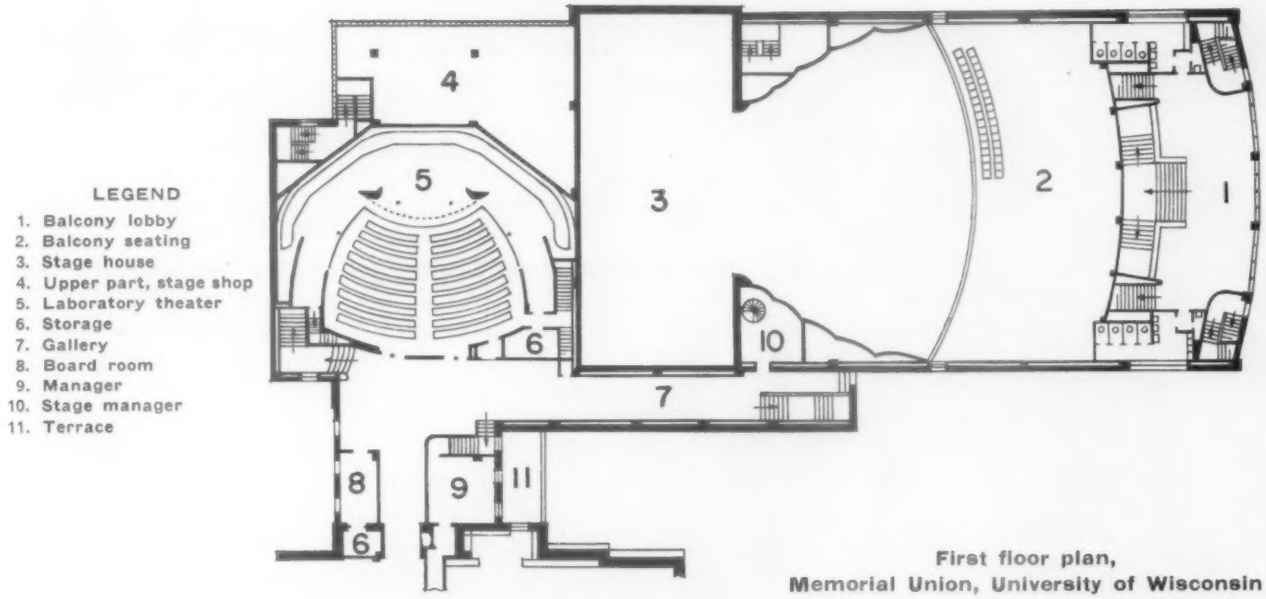


Michael M. Hare, project designer; Lee Simonson, theater consultant; Corbett and MacMurray, architects; State Bureau of Engineering, resident architect

Ground floor plan of Memorial Union, University of Wisconsin

LEGEND

1. Vestibule
2. Lobby
3. Gallery
4. Stage
5. Stage shop
6. Dressing rooms
7. Costume storage
8. Dyeing room
9. Male chorus
10. Costume shop
11. Dressing room
12. Assistant manager
13. Combined green room, female chorus room, and make-up room



First floor plan,
Memorial Union, University of Wisconsin

or 2 feet. It should never be higher than 3 feet. In front of the curtain line an "apron" of 30 inches in depth should be provided to house footlights. These should be of the disappearing type, now standard with all leading manufacturers, so that the apron can be used as a forestage when so needed.

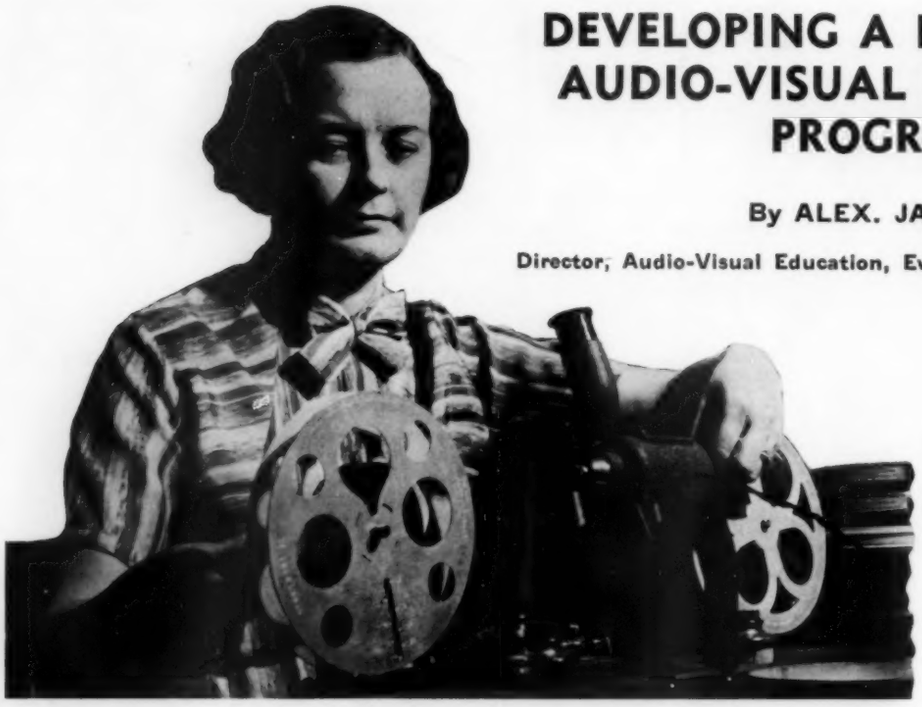
As to the stage floor itself, the commonest mistake is to increase its cost by making it of hardwood and thereby almost useless as far as stage setting is concerned. Stage settings have to be propped at regular intervals by stage braces which are quickly screwed into the floor when the scene is set, and unscrewed as quickly when the set is struck. They cannot be screwed into hardwood. Long-grained softwood should be used. The long grain will reduce splintering to a minimum. But in order to protect the feet of barefoot dance groups, the stage floor can be covered with linoleum, which stage screws can take hold of.

A proscenium opening 30 feet wide need never be more than 20 feet high. This is an agreeable proportion. The curtain will rarely be raised more than 15 to 17 feet. The opening itself should not be emphasized with ornament, which will merely be an eyesore when the forestage is in use. The more subtly and unobtrusively the walls of the auditorium die into the proscenium opening, the better.

The height of the stage proper, backstage, or the stage house as it is called, is a combined problem of sight lines and the method used to strike and set scenery. Scenery is built in small units and has to be lashed together when set, and unlashed when struck. Smaller units can be stacked against the back wall or side walls. Large units cannot be handled in this way. The traditional method and the simplest one mechanically is to haul them up out of sight with ropes or wire cable working through sheaves attached to a slotted metal gridiron overhead. But a large proportion of the audience is not only looking at the stage but up into it. Therefore the gridiron must be high enough to haul the large units of scenery out of sight when not in use. If it cannot be hoisted out of sight, there is no sense in hoisting it at all. Fifty-five feet above the stage floor (with head room above it to the roof) is a minimum height for the gridiron.

In addition to space, light is the prime requisite of a stage. The modern stage structurally is a black hole; it can be transfigured only by electric light, the only genuinely new instrument that modern technic has added to dramatic presentation. Enough electric light, flexibly and sensitively controlled, is an essential part of any theater's equipment, however small. If a school theater is to be a source of esthetic training and a rounded esthetic experience for students who participate in it, light is one of the essential mediums they must learn to use and to master. To do this it must be technically complete and correctly installed.

In planning school theaters it is well to remember that they can serve as a cultural center not only for the school but for the entire adult community in the neighborhood, the district, or the region that the school serves. The school theater can be used by night as well as by day for lectures, concerts, choruses, noncommercial films not featured at local movie palaces, and for occasional performances by professional companies on tour. Its lobbies can be made to serve as well for traveling exhibitions. The school theater well-planned and well-equipped can be made a vital center of community life.



DEVELOPING A FUNCTIONAL AUDIO-VISUAL EDUCATION PROGRAM

By ALEX. JARDINE

Director, Audio-Visual Education, Evansville, Ind., Public Schools

UNTIL five years ago the Evansville Public Schools had no department of audio-visual education. Prior to that date each school in the system had to develop its own program. Since no one was directly responsible for visual education in each school, much of the planning and carrying-out of such activities fell to the principal. Equipment was scarce, materials were not available, and in general the program lacked coherence.

Preliminary Study

A committee of principals was appointed by the superintendent in 1934 to study the problem. This group arrived at the conclusion that to some one person should be delegated the task of developing a program of visual instruction for the Evansville Public Schools. At that time consultants were assisting school systems to determine their visual education needs by conducting surveys. The Evansville situation was studied for several weeks before a report of the survey was published in mimeographed form as "A Program for the Utilization of Audio-Visual Teaching Aids."

The consultants found that the twenty-one public schools had seven 16-mm silent machines, six 35-mm silent machines, no 16-mm sound projectors, and one 35-mm sound projector. There were seven 16-mm films owned by the schools. Thirteen auditoriums had screens and there were seven portable screens. Other equipment included 18 stereopticons, 3 film slide projectors, and 189 film strips. There were approximately 5,000 slides in the various schools.

Some of these materials had been purchased by the schools themselves, some by Parent-Teacher Associations, and some by the Board of Education. Very little of the equipment was up to date, and no regular repair service was available. Most of the slides belonged to sets many of which were incomplete, and few were being used to any extent. Each school had one radio which was used almost exclusively by the music department.

Very few buildings were equipped for projection. Rooms were in need of opaque shades and electrical outlets. The difficulties encountered by most teachers in making arrangements for projection and ultimately receiving unsatisfactory projection was enough to discourage the best teacher. In short, five years ago Evansville was in a position similar to that in which most school systems find themselves at the present time.

Inaugurating the New Program

Once the problem was recognized, however, Evansville began to plan for the future, through the committee of principals and the survey. Available films, slides, projectors and all types of visual materials were studied by the committee. After checking courses of study to see what materials could be properly integrated, a minimum selection was outlined. Projectors were carefully examined and recommendations made. Each building was subsequently equipped with motion picture projection facilities, stereopticons, and other types of materials as the program developed.

A director was selected and put in charge of the program. His area was designated as relating to visual education. A central library was established and staffed. In addition to the director, the department consists of a full-time delivery man, a clerk who serves as booking clerk for all materials in the local library and who also services films, a part-time technician, and an office secretary. The office secretary handles all correspondence, telephone calls, and bookings on out-of-town films. In each building one teacher has been designated to care for visual equipment. This person acts as a clearing-house for all problems within his building, trains new teachers to operate equipment and attends to all problems relating to his own school. This work is a special assignment to the teacher.

Keeping the Equipment Up to Date

Each year since the program was started, a budget has been set up to provide for purchase of additional materials and maintenance of present equipment. Gradually the schools are becoming well equipped with visual materials. Each month the technician checks on all equipment and remedies any mechanical difficulties. He is also subject to call and will make emergency trips to care for unexpected troubles. He overhauls all equipment thoroughly during the summer and makes any repair and replacement necessary. So far no school is ever without a projector for any length of time. One extra projector is kept at the visual education library for such emergencies.

Circulation of Visual Materials

On Thursday of each week each school requests its materials for the following week. These requisitions are picked up by the visual education truck. The clerk in the visual education library books all requests. Whenever there is a conflict, it is cleared up by telephone. Materials are booked for two days to a school, are picked up and returned to the library for inspection and repair, and then are sent out again for a two-day period. Materials circulated include films, slides and flat pictures.

From other sources, such as professional publications, film catalogs, government lists, etc., requests are made for free films not owned by the schools. Dates have to be chosen, letters written, and telephone calls made to arrange for pictures such as these. Films of this kind are usually asked for a long period of time so that many schools may use them. Booking and routing these films is cared for by the office secretary. Films on Safety, Home Economics, Health, Physical Education, and Industrial Arts which are secured from outside sources are listed by units, scheduled for a time when they will best fit into the program and are requested weeks or even months in advance. New publications are scanned for releases to be purchased or available for free use. All new releases are used by a teacher or two who evaluate them before they are circulated generally. Lists of these materials are circulated among teachers. Catalogs of all materials owned by the schools are placed in the hands of all teachers.

The visual education department has the use of a truck for delivering materials to the various schools

To aid teachers to call for films and slides when they fit into work being studied, several devices have been employed. Special guides have been prepared for the social studies and commercial fields. Visual materials have been keyed into many units in courses of studies at all levels and in most areas. Simple instructions are given as to how these materials may be secured. Teachers have aided generously in helping to determine film and slides to be purchased. They, too, have indicated where the materials will best fit.

Sight-Seeing Trips

Audio-visual education in Evansville is not restricted to films and slides. Teachers and pupils are encouraged to use all other types of visual aids. One of the most vital of these has been the school journey. By special arrangement with school-bus drivers who bring students to one of the high schools, their buses are made available at nominal cost for school trips. During the year hundreds of these trips are scheduled. Teachers are encouraged to make trips which have a definite purpose and which fit into the activity or unit being studied. A few trips have been made by groups to Vincennes, New Harmony and the Lincoln country.

By way of acquainting civic groups with the work of the schools, trips have been arranged for these organizations to visit the schools and have their luncheon meetings there.

Plans are now under way for a new experimental core program in the freshman year of one of the high schools. This program will include a great deal in the way of audio-visual aids. Trips, radio activities, slides, motion pictures, all will find a place. As yet, the whole idea is just a little vague, but those of us who are working with it feel that it offers great possibilities.

Broadcasts from the Schools

Each of the high schools is equipped with public address systems of the portable type. These are used in the school auditoriums, on the athletic fields, and for outdoor music events. We find that students enjoy working before a microphone. It assists many in their speech work. The public address system does have some shortcomings, but a good unit can be of great aid in motivating better work. The public schools own remote amplifying equipment designed for broadcasting directly from schools over commercial facilities.

A number of excellent programs have been originated from schools during the past year. The schools sponsor two regular series of radio programs over local stations. The "You and Your Schools" series have been running now for three years. This year the series is featuring "Good Books." It is being run as an experiment in reading and is a joint activity with the University of Wisconsin. Another series is presented by the public schools music department. All programs are one-half hour in length and are well scheduled as to time. Facilities of Station WEOA, a CBS outlet, and WGBF, an NBC outlet, are at the disposal of the schools. All programs are written months in advance, are carefully rehearsed, and are recorded while the program is on the air. The transcriptions are given to the school doing the broadcast and are used for teaching purposes. The music and dramatic departments have found these transcriptions very helpful in doing remedial and corrective work. One high school is now testing portable recording equipment with a view to adding it to the equipment now owned by the school.

Radio Equipment in the Elementary Schools

Several elementary schools also are equipped with public address systems. One elementary school has a complete central sound system useful in communicating from the office with the separate rooms, and particularly valuable for piping radio programs to any or all rooms in the building. Every school is equipped with several portable radios which are used for receiving radio programs. An indication that the schools are not as straight-laced as they once were is seen when whole classes are found listening intently to last-minute reports on the European crisis, or are engrossed with a lesson in the Columbia School of the Air series. The radio station managers have been cooperative in furnishing advance information on educational programs. This information is then passed on to teachers in the schools through the medium of the Public School Bulletin.

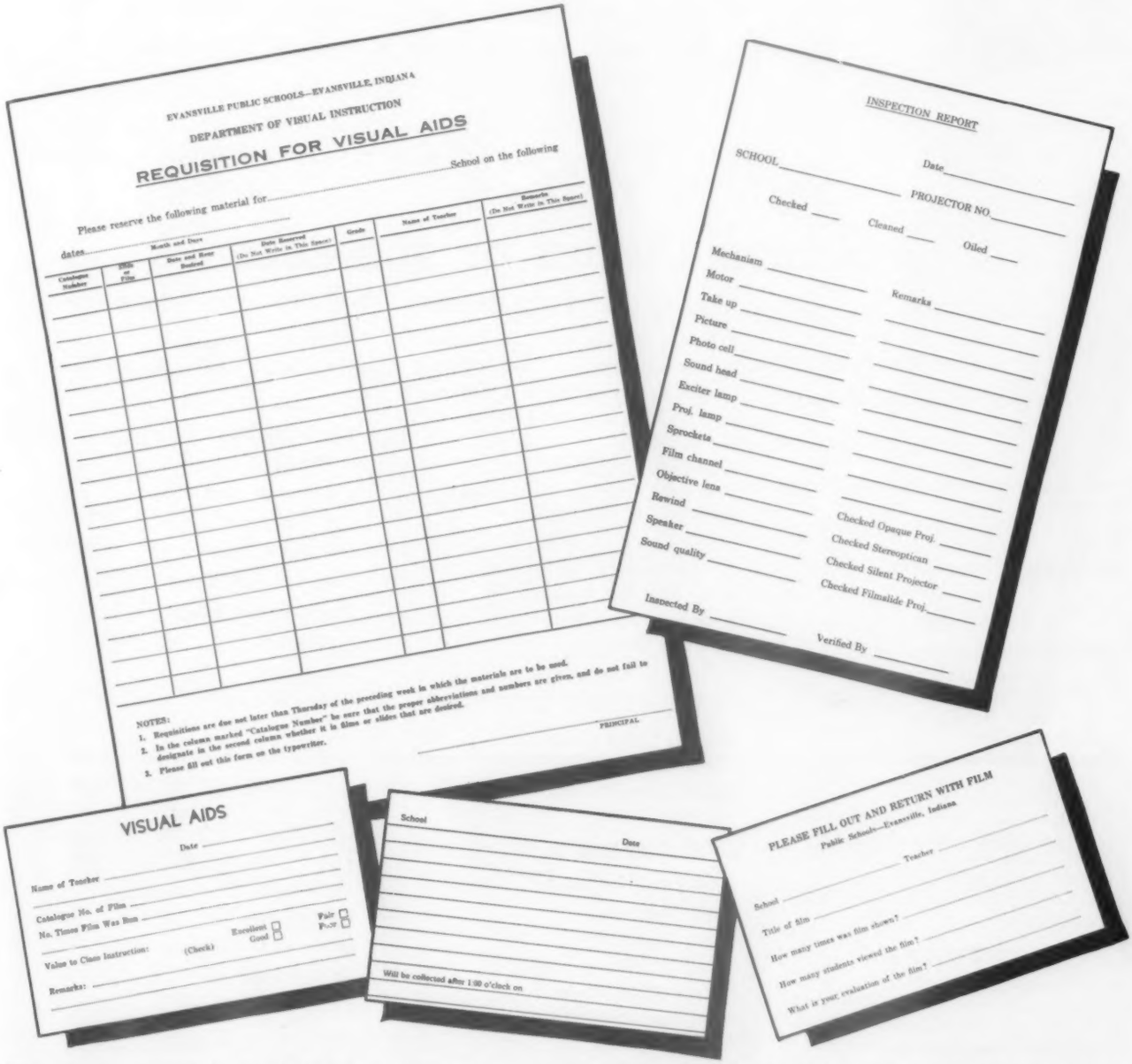
Plans for the Future

Evansville has developed its program of audio-visual instruction through the preliminary steps as outlined by the survey. We are now in what might be termed the experimental stage. Numerous experiments with slides, motion pictures, and radio programs are proving the real value of these newer media.

The future of our program is largely dependent upon our own abilities to develop it. Some of our problems involve better utilization of available materials; a greater amount of in-service training of teachers in proper use of audio-visual aids; still more worth-while experimentation; and the constant addition of good audio-visual aids as soon as they have been proved worthy.

Suggestions for Other Schools

Superintendents and principals from all over the country have written to our department asking how we began our program and how we would advise that they begin one. Since every school situation presents problems unique to that system, there is no set pattern to be prescribed for all. There are, however, a few steps common to planning all programs. First, an investigation of materials possessed by the school is essential. Second, some person must be designated as director of the program. In a large system this person may be a full-time director; in a smaller system a principal or teacher who is relieved of other work. Third,—and this probably should be first,—the board of education or trustees should be sold on the program and be willing to invest money in it. Fourth, administrators and teachers should be willing to give the program a fair trial. Fifth, equipment and materials should be selected carefully. Closeness to service agencies in case of breakdowns should be considered. Next, plans for circulating materials should be worked out. Finally, experimentation, integration, and expansion of the program should take place.



These forms are used by principals and teachers to insure that equipment operates effectively and that materials are on hand promptly

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Excursions in Science No. 1
Excursions in Science No. 2—No. 3—No. 4

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Walter Damrosch
Life of Thomas A. Edison
Service to Agriculture
*Just Around the Corner
The Benefactor
Thomas A. Edison
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*From Now On
The Molder
Something New Under the Sun
*Three Women
Bill Howard, R.F. D.
The World's Largest Electrical Workshop

WELDING

The Electric Needle
Ties of Steel
Automatic Arc Welding
Welding Battered Rail Ends
Arc Welding in Building Erection

* Available from Schenectady only.

ELECTRIC EQUIPMENT

Unseen Values in G-E A-c Motors
Service to Industry
Unseen Values in G-E D-c Motors
Quality Motors in the Making
The Busybody
Mountains of Copper
A Modern Zeus
Electric Heat in Industry
Enameling by Electric Heat
How the G-E Icing Units Works
When You Can Measure
More Goods for More People with Automatic Control

LIGHT AND LIGHTING

Brighter Times Ahead
The Light of a Race
Mazda Lamp Manufacturing

GENERATION AND DISTRIBUTION OF ELECTRICITY

Steam Turbines
Power Transformers
Induction Voltage Regulator
Hydroelectric Power
Installing a Primary Network Equipment
Oil-filled Cable
There's a Difference

INDUSTRY

The Potter's Wheel
Cuba, The Island of Sugar
The Land of Cotton
The Sugar Trail
A Woolen Yarn
Conquest of the Forest
The Conductor
Our Daily Bread
Wizardry of Wireless
The World of Paper
Anthracite
Bituminous
Pillars of Salt

TRANSPORTATION

Conquest of the Cascades
The Broken Barrier
The Zephyr
King of the Rails
Queen of the Waves
Trolley Coaches
The Panama Canal
Illinois Central Locomotive
Modern Electric Transit

ERPI CLASSROOM FILMS INC.

35-11 Thirty-fifth Avenue, Long Island City, New York

INSTRUCTIONAL SOUND FILMS

Produced under the sponsorship of leading educators, each of the scores of films now offered you by Erpi Classroom Films Inc. is made solely for classroom use. Each one is scientifically planned as an integral unit of study. Each one may be used to advantage not simply in one course or grade, but in a number of different courses and grades.

BROAD RANGE OF SUBJECT MATTER

In sharp contrast to the situation of just a few years ago, Erpi Classroom Films Inc. now offers to your school a comprehensive library of sound films covering the Biological Sciences, the Physical Sciences, Human Geography, Music, Arts and Crafts, Athletics, Child Psychology, Vocational guidance—for use from primary grades through high school.

A printed study guide with each film helps the teacher to prepare for its use and suggests specific objectives to be attained in its use

These are not films made for some other purpose and later adapted to educational use, but each was produced specifically for classroom use, taking full advantage of all modern techniques in photography, animation and recording.

CONTINUING PRODUCTION PROGRAM

Since its inception, Erpi Classroom Films has produced approximately 150 films; the rate of production for the past three years being 24 films per year, which schedule it is planned to continue.

For the new catalog, "Instructional Sound Films for the Classroom"—which describes each of the many films in detail—write to the address at top of page.

SEE NEXT TWO PAGES for Integration Charts which give the complete list of Erpi Instructional Sound Films, and graphically show the many ways in which each film may be used.

Erpi Classroom Films Inc.

(Numbers in Columns Indicate Subjects With Which Films at Left are Correlated)

Erpi Classroom Films Inc.

FILMS

	1 Teaching of Reading	2 Composition	3 Nature Study	4 Elementary Science	5 Social Studies	6 Geography	7 General Science	8 Agriculture	9 Industrial Arts	10 Biology	11 Botany	12 Zoology	13 Chemistry	14 Physics	15 Sociology	16 Economics	17 History	18 Spanish	19 Arts and Crafts	20 Music	21 Home Economics	22 Physical Geography	23 Geology	24 Physical Education	25 Speech	26 Hygiene	27 Vocations	28 Club Programs	29 Adult Education
PRIMARY SERIES																													
ADVENTURES OF BUNNY RABBIT		1	2	3	4	5																						28	
FARM ANIMALS		1	2	3	4	5																						28	
ANIMALS OF THE ZOO		1	2	3	4	5																						28	
THREE LITTLE KITTENS		1	2	3	4	5																						28	
ROBIN REDBREAST		1	2	3	4	5		7						10		12												28	29
GRAY SQUIRREL		1	2	3	4	5		7						10		12												28	29
NAVAJO CHILDREN		1	2			5	6													15								28	29
MEXICAN CHILDREN		1	2			5	6													15								28	29
POULTRY ON THE FARM		1	2	3	4	5																						28	
AN AIRPLANE TRIP		1	2		4	5																						28	29
A BOAT TRIP		1	2		4	5	6																					28	
GOATS		1	2	3		5			8		10		12												21			28	
BLACK BEAR TWINS		1	2	3	4	5					10		12															28	
CHILDREN OF HOLLAND		1	2			5	6													15	16							28	29
SHEP THE FARM DOG		1	2	3	4																							28	
COLONIAL CHILDREN		1	2			5														15	16	17		19		21			28	29
THE FIREMAN		1	2		4	5		7																				28	
HUMAN GEOGRAPHY SERIES																													
WATER POWER			2		4	5	6	7	8	9											16					22		28	29
OUR EARTH			2		4	5	6																			22		28	29
SHELTER			2		4	5	6	7												15					21			28	29
CLOTHING			2		4	5	6	7												15					21			28	29
CONSERVATION OF NATURAL RESOURCES			2	3	4	5	6	7	8			11								15	16	17				22		28	29
ANIMALS IN MODERN LIFE			2		4	5	6	7	8																			28	29
A BACKWARD CIVILIZATION			2			5	6		8											15		17		19				28	29
THE DEVELOP. OF TRANSPORTATION			2		4	5	6	7		9											16	17						28	29
CANALS OF ENGLAND			2		4	5	6													15	16	17						28	29
SHELL-FISHING			2			5	6				10									15								28	29
NEW ENGLAND FISHERMEN			2			5	6				10									15								28	29
THE WHEAT FARMER			2		4	5	6		8																			28	29
NAVAJO INDIANS			2			5	6													15		17		19				28	29
LAND OF MEXICO			2			5	6													15	16	17	18	19				28	29
PEOPLE OF MEXICO			2			5	6													15	16	17	18	19				28	29
THE TRUCK FARMER			2		4	5	6	7	8											15	16				21			28	29
THE PYGMIES OF AFRICA			2			5	6		8											15	16							28	29
THE ORANGE GROWER			2		4	5	6	7	8		10										16				21			28	29
A PEOPLE OF THE CONGO			2			5	6													15				19				28	29
IRRIGATION FARMING			2			5	6	7	8											15	16				21			28	29
THE MACHINE MAKER			2		4	5	6	7		9					13	14	15	16	17		19				21			28	29
THE CATTLEMAN			2			5	6		8								15	16							21			28	29
THE WATUSSI OF AFRICA			2			5	6										15	16							21			28	29
SCIENCE AND AGRICULTURE			2		4	5	6	7	8			11			13	14	15	16							21			28	29
THE CORN FARMER			2		4	5	6	7	8		10						15	16							21			28	29
PLANT LIFE SERIES																													
PLANT GROWTH			2	3	4			7	8		10	11																28	29
ROOTS OF PLANTS			2	3	4			7	8		10	11																28	29
LEAVES			2	3	4			7	8		10	11																28	29
FLOWERS AT WORK			2	3	4			7	8		10	11																28	29
SEED DISPERSAL			2	3	4			7	8		10	11																28	29
FUNGUS PLANTS			2	3	4			7	8		10	11																28	29
THE DODDER			2	3	4			7	8		10	11																28	29
PLANT TRAPS			2	3	4			7	8		10	11																28	29
ANIMAL LIFE SERIES																													
THE FROG			2	3	4			7			10		12															28	29
HOW NATURE PROTECTS ANIMALS			2	3	4			7	8		10		12															28	29
BEACH AND SEA ANIMALS			2	3	4			7			10		12															28	29
TINY WATER ANIMALS			2	3	4			7			10		12															28	29
BUTTERFLIES			2	3	4			7			10		12															28	29
MOTHS			2	3	4			7	8		10		12															28	29
BEETLES			2	3	4			7	8		10		12															28	29
POND INSECTS			2	3	4			7			10		12															28	29
APHIDS			2	3	4			7	8		10		12															28	29
SPIDERS			2	3	4			7			10		12															28	29
THE HOUSE-FLY			2	3	4			7	8		10		12															28	29
BIRDS OF PREY			2	3	4			7			10		12															28	29
THRUSHES AND RELATIVES			2	3	4			7	8		10		12															28	29

(Numbers in Columns Indicate Subjects With Which Films at Left are Correlated)

Erpi Classroom Films Inc.

FILMS

FILMS	1 Teaching of Reading	2 Composition	3 Nature Study	4 Elementary Science	5 Social Studies	6 Geography	7 General Science	8 Agriculture	9 Industrial Arts	10 Biology	11 Botany	12 Zoology	13 Chemistry	14 Physics	15 Sociology	16 Economics	17 History	18 Spanish	19 Arts and Crafts	20 Music	21 Home Economics	22 Physical Geography	23 Geology	24 Physical Education	25 Speech	26 Hygiene	27 Vocations	28 Club Programs	29 Adult Education
HUMAN BIOLOGY SERIES																													
BODY DEFENSES AGAINST DISEASE		2								7				10														26	28 29
THE HEART AND CIRCULATION		2								7				10														26	28 29
MECHANISMS OF BREATHING		2								7				10														26	28 29
THE NERVOUS SYSTEM		2								7				10														26	28 29
REPRODUCTION AMONG MAMMALS		2										8		10		12												26	28 29
HEREDITY		2										8		10		12												26	28 29
DIGESTION OF FOODS		2								7				10			13					21						26	28 29
THE ALIMENTARY TRACT		2												10														26	28 29
FOODS AND NUTRITION		2								7				10			13					21						26	28 29
ENDOCRINE GLANDS		2								7				10			13											26	28 29
ASTRONOMY SERIES																													
THE MOON		2		4						7																			28 29
THE EARTH IN MOTION		2		4						7																			28 29
THE SOLAR FAMILY		2		4						7																			28 29
EXPLORING THE UNIVERSE		2		4						7																			28 29
GEOLOGY SERIES																													
THE WORK OF THE ATMOSPHERE		2		4						7	8														22	23			28 29
THE WORK OF RIVERS		2		4						7	8														22	23			28 29
GROUND WATER		2		4						7	8														22	23			28 29
GEOLOGICAL WORK OF ICE		2		4						7	8														22	23			28 29
MOUNTAIN BUILDING		2		4						7	8														22	23			28 29
VOLCANOES IN ACTION		2		4						7	8														22	23			28 29
THE EARTH'S ROCKY CRUST		2		4						7	8														22				28 29
THE WEARING AWAY OF THE LAND		2		4						7	8														22				28 29
THE WORK OF RUNNING WATER		2		4						7	8														22				28 29
PHYSICS SERIES																													
FUELS AND HEAT		2		4						7			9																28 29
DISTRIBUTING HEAT ENERGY		2		4						7			9																28 29
ENERGY AND ITS TRANSFORM.		2								7			9				13	14											28 29
THERMODYNAMICS		2								7			9					14											28 29
FUNDAMENTALS OF ACOUSTICS		2								7			9					14						20				25	28 29
ELECTROSTATICS		2								7			9					14											28 29
SOUND WAVES AND THEIR SOURCES		2								7			9					14						20				25	28 29
ELECTRODYNAMICS		2								7			9					14											28 29
ELECTRONS		2											9				13	14											28 29
LIGHT WAVES AND THEIR USES		2								7			9					14											28 29
CHEMISTRY SERIES																													
OXIDATION AND REDUCTION		2								7			9				13	14											28 29
MOLECULAR THEORY OF MATTER		2								7			9				13	14											28 29
ELECTROCHEMISTRY		2								7			9				13	14											28 29
VEL. OF CHEM. REACTIONS		2															13												28 29
COLLOIDS		2								7							13												28 29
CATALYSIS		2															13												28 29
MUSIC SERIES																													
THE SYMPHONY ORCHESTRA		2																		20								27	28 29
THE STRING CHOIR		2																		20								27	28 29
THE BRASS CHOIR		2																		20								27	28 29
THE WOODWIND CHOIR		2																		20								27	28 29
THE PERCUSSION GROUP		2																		20								27	28 29
ATHLETIC SERIES																													
DASHES, HURDLES, RELAYS		2																						24					28 29
WEIGHT EVENTS		2																						24					28 29
JUMPS AND POLE VAULT		2																						24					28 29
DISTANCE RACES		2																						24					28 29
CHILD PSYCHOLOGY SERIES																													
POSTURE AND LOCOMOTION		2																			21								28 29
A 36 WEEKS BEHAVIOR DAY		2																			21								28 29
EARLY SOCIAL BEHAVIOR		2																			21								28 29
VOCATIONAL GUIDANCE SERIES																													
THE BUILDERS		2																										27	28 29
CHOOSING YOUR VOCATION		2																										27	28 29
ART SERIES																													
ARTS AND CRAFTS OF MEXICO		2						5	6									15			18	19						27	28 29
POTTERY MAKING		2						5														19						27	28 29
METAL CRAFT		2						5					9									19						27	28 29
PLASTIC ART		2						5														19						27	28 29

NEUMADE PRODUCTS CORPORATION

431 W. 42d St., New York — *Executive and Sales* *Factory* — Buffalo, New York

16 mm. MANUFACTURERS OF QUALITY MOTION PICTURE EQUIPMENT 35 mm.

CABINETS	CLEANERS	PROJECTION TABLES	HAND REWINDS	SHIPPING CASES
RACKS	CEMENT	INSPECTION TABLES	MOTOR REWINDS	REELS AND CANS
MEAS. MACHINES	LEADER	EDITING TABLES	SPLICERS	REEL BANDS

PROTECT YOUR FILM

Keep your valuable school films fresh and clean, ready for use—today, tomorrow, next year. Preserve and protect them from becoming brittle, dried out, full of dust, dirt, oil and grime.

CABINETS SPECIALLY DESIGNED FOR FILMS

Humidified	Dustproof	All Steel
Tamperproof	Fireproof	Indexed

TRADE MARK *Neumade*

Established 24 years

A REPRESENTATIVE GROUP OF THE MANY NEUMADE PRODUCTS

No. 1. **SAFE CABINET**—Holds 50 reels, each in separate double wall compartment with door, handle, index card.

2. **MM-16**—For 800, 1200 and 1600 ft. reels, indexed, humidified; stack like sectional bookcases.

3. **MM-102**—Holds 100-400 ft. reels, humidified, key lock, large space in base for movie equipment.

4. **MM-55**—For fifty 800, 1200 or 1600 ft. reels; humidor drawer, double doors, key lock.

5. **DC-415**—Facilities for 92-400 ft. and 18 large reels; indexed; key locks.

6. **"ST"**—Individual double wall compartments for one or two reels. Available in 5, 6, 8, 10 or 12 compartment units for all size reels.

7. **PD-1**—Motor driven rewind assembly operates at any speed easily controlled by foot pedal.

No. 8. **PRECISION MEASURING MACHINES** — Complete line of single and multiple hub models for every need—frame or footage.

9. **NEUVATOR**—Automatic film renovator; cleans, conditions, polishes and rewinds in one motor driven operation.

10. **INNOVATION**—They stack like sectional bookcases; each unit complete cabinet for 20-400 ft. reels; add as your library grows.

11. **SPECIAL** — Typical example of special design cabinets for specific needs. Model shown holds 180 reels and over 700 filmstrips.

12. **FILM RACKS**—Assembled on order for any desired facilities for any size reels. Films held erect in place at all times, index card for each.

No. 13. **T-134**—Projector tilt table, adjustable up to 10" rise; 2 sturdy shelves.

14. **REWINDER BOARD** — For 1600 ft. reels; 2 geared arms, Griswold Splicer, cement applicator, weighted porcelain panel—also JUNIOR MODEL for 400 ft. reels.

15. **DC-200** — Combination storage and work unit; holds 120 reels, filled drop door shelf makes ideal work surface; 2 utility drawers.

16. **COMBINATION**—Example of specially developed units for specific needs. As shown, holds 100-8 mm. and 100-16 mm. reels with three shelf surfaces. Can be increased to 150-8 mm. and 160-16 mm.

No. 16 for 16 mm. **SEND FOR CATALOG** No. 4 for 35 mm.

RCA VICTOR

Audio-Visual Service

Educational Department

RCA MANUFACTURING COMPANY, INC.

•

CAMDEN **NEW JERSEY**

OFFERS A COMPREHENSIVE
AUDIO-VISUAL SERVICE
ESPECIALLY PLANNED
FOR SCHOOLS

THIRTY YEARS AGO the Victor Talking Machine Company established an Educational Department, designed to bring schools the benefits of recorded aids to instruction.

Since that time the tremendous advances in electronic engineering, many of them from the Laboratories of RCA Victor, have placed at the disposal of schools a vast number of additional teaching aids that have since become "standard." In this, the latest edition of RCA Victor Audio-Visual Service for Schools, we have made every effort to show, not only the new types and models of equipment, but also the *applications* of those instruments to make your efforts more productive, more enjoyable.

Obviously it is impossible to present here any *one* system or *combination* of units which would be "best" for *all* schools. However, the range of RCA Victor equipment for schools is so complete, so flexible, that there *is* a proper combination to meet the special requirements of any school.

It is here that the widespread facilities of RCA Victor are of invaluable assistance to you. For, RCA engineers are as close to you as the nearest RCA Victor District Office or RCA Victor Distributor. The experience of these engineers and of the Educational Department, are at your disposal in the selection of the proper equipment to solve the sound problems of *your* school.

We invite your inquiries, whether they concern the Master Control Sound Systems, Recording Apparatus, Victrolas, Victor Records, 16 MM Sound Motion Picture Projectors, Laboratory Apparatus or any other type of audio-visual equipment. We offer you the benefits of a specialized knowledge gained from thirty years of experience in developing sound equipment and related sound and visual aids to instruction in schools of all sizes.

Inquiries addressed to the Educational Department, RCA Manufacturing Company, Inc., Camden, New Jersey, will receive prompt attention.

RCA Victor Audio-Visual Aids to Education lighten the labors of principal and teacher and make the task of learning easier and more pleasant for the pupil. They enrich the curriculum of the school.

"Trademarks 'RCA Victor,' 'Victor,' 'Red Seal,' 'Victrola,' 'Antennaplex,'—Reg. U. S. Pat. Off. by RCA Mfg. Co., Inc."
(Published prices subject to change without notice.)

RCA VICTOR RECORDING and Instantaneous PLAYBACK EQUIPMENT

For Voice Training • Speech Correction • Public Speaking • Glee Clubs • Choral Work • Dramatic Presentations • School Bands and Orchestras • Special Events

DELUXE MODEL

There is an ever increasing use of recording and playback equipment as a means of determining speech defects and measuring progress in speech and music instruction accurately and scientifically. This has added to the importance of certain fundamentals which a recorder should possess. To give entirely satisfactory results it must be capable of recording and reproducing with *accuracy*. It must also be *built* to withstand hard usage. Certainly it must be *dependable* in operation and *easy to use*. The RCA Victor recorder was designed to meet these exacting requirements in school use.

This instrument (*at right*) is one of the most versatile recorders available. It will record and reproduce records at speeds of 78 or 33⅓ RPM, using 6-inch to 16-inch records, and cutting inside-out or outside-in. Among the many features that facilitate recording and fidelity of reproduction are the Visual Indicator Meter to insure proper recording level, the new and improved Cutting and Recording Head with RCA Float Stabilizer, High Fidelity Amplifier and Speaker, Volume and Tone Controls, Reproducing Pickup and Tone Arm. A specially designed motor assembly insures complete freedom from distortion. It is the ideal equipment for permanent installation in the modern school.

SPECIFICATIONS

Voltage: 105-125 volts AC., 60 cycles. *Power Consumption:* 155 watts. *Input Impedance:* 250 ohms; auxiliary jack 1,200 ohms. *Power Output:* 3 watts. *Overall Gain:* 105 db. *Frequency Response:* 60-6,500 cycles. *Loudspeaker:* 12″ Permanent Field. *Dimensions:* 35¼″ H., 27″ W., 22″ D. *Net Weight:* 136 lbs. Finish two-tone grey.

SPECIFICATIONS

Voltage: 105-125 volts AC., 60 cycles. *Power Consumption:* 127 watts *Input Impedance:* 100,000 ohms. *Power Output:* 3 watts. *Overall Gain:* 105 db. *Frequency Response:* 60-6,500 cycles. *Loudspeaker:* 6″ Permanent Field. *Dimensions:* 12½″ H., 15½″ W., 17½″ D. *Net Weight:* 37½ lbs. Finish grey.

RCA VICTOR PORTABLE RECORDER

Here is a *portable* instrument which provides the quality of recording and reproduction that you would expect from RCA Victor, the pioneers in the development of sound recording. This portable model is designed for schools where it is desirable to use the recording and playback instrument in various locations. The RCA Victor Portable Recorder, Model MI-12701, is complete in an attractive case, with handle for carrying it from one room or building to another with ease. It records at a speed of 78 RPM on 6-, 8-, 10- or 12-inch records. Using outside-in method of recording, the records may also be played on your Victrola or School Sound System. Completely equipped, this RCA Victor Recorder is an outstanding portable model for general school use.

RECORDING DISCS • RECORDING NEEDLES

Recording discs in 6″, 8″, 10″, 12″ and 16″ diameters and steel or sapphire styli are available at all RCA Victor Distributors (see back cover).

Lightens Administrative Burdens Increases Efficiency of Teaching Enriches the School Curriculum

Either of the two new RCA Victor Master Control Sound Systems offers the principal a modern method of handling the ever increasing administrative duties of a school. They not only make it easier, more enjoyable to run the school but also increase the efficiency of teaching through the school. They add to the joy of study, by enriching the curriculum.

As an example, either of the RCA Victor Master Control Sound Systems enables the principal or superintendent to make simultaneous announcements to any or all parts of the school building or grounds without leaving his office. It permits him to communicate with any or all teachers by merely throwing the proper switch and speaking into the microphone located either at his desk or in a separate control room connected with his office. Fire drills; first aid; emergencies; checking of attendance or punctuality; health or general programs; controlled tests—all can be handled with a minimum of effort by the busy executive.

General School Activities

Record (or radio) programs in auditorium.

•

Music program by school band, orchestra, records.

•

Marching records.

•

Background music for assembly.

•

Records for dancing class.

•

Broadcasts of significant public events.

•

Sound effects for plays.

Extra Curricular Activities

Announcing outdoor athletic events.

•

Exercises on school grounds.

•

Stage effects.

•

Coaching of dramatics.

•

Commentary on indoor sports events.

•

Visiting lecturers and speakers.

•

P.T.A. meetings.

•

School dances and socials.

General Administrative Uses

Announcements.

•

Communication.

•

Emergencies.

•

Discipline.

•

Program System.

•

Increased Efficiency.

•

Student Training.

•

Controlled Testing.

•

Safety Campaigns.

Classroom Instruction

By means of Radio and Phonograph:

•

Musical programs.

•

Social Science programs.

•

Current Events.

•

Foreign Language Study.

•

Music Appreciation.

•

Special Programs.

•

Physical Education.

•

Speech Training.

SOUND SYSTEMS

RCA VICTOR DELUXE SYSTEM

The heart of the RCA Victor Deluxe Master Control Sound System is the master control console. Whether for classroom, auditorium, cafeteria, music appreciation room or outdoor locations, all broadcasts, announcements, radio programs or record programs clear through the master control. Located in the principal's office or in an adjoining room, it enables him to exercise control over the entire school. This Deluxe Model is designed for service to schools requiring from 20 to 120 speakers. Loudspeakers can be controlled individually or all speakers can be utilized at the same time through the simple operation of the master switch. Included in the cabinet are *two* radio receivers, permitting simultaneous reception of *two* radio programs which can be transmitted over two separate circuits to different classrooms or groups of classrooms.

Included also is an automatic record player providing continuous programs of recorded music. Standard 16-inch electrical transcriptions can be played through the system by the use of the turntable shown on page 6.

All-electric bells can also be transmitted through this control panel. These are also described on page 6.

ADDITIONAL FEATURES

New console desk-type control with multiple program facilities. • RCA Victor gentle-action automatic record-playing mechanism plays eight 10″ or seven 12″ records • Electric Clock • Visual volume indicator • Microphone pick-up at central control location and other points desired, with provisions for remote volume control from all locations • Two separate programs may be transmitted simultaneously through selected channels with an additional channel available for communications • Equipped for attaching RCA Victor Recording Attachment described on Page 6 • Recording Attachment provides for instantaneous recording of speech and music • Beautiful walnut finish cabinet • Dimensions: W. 55″, H. 44½″, D. 26″. • Net weight 250 lbs.

RCA VICTOR JUNIOR SYSTEM

The RCA Victor Junior Master-Control Sound System is especially designed for installation in schools with 10 to 40 rooms. It has a 12-tube High Fidelity radio receiver with Electric Tuning for 8 stations, a Victrola which accommodates 10- or 12-inch records and a microphone for making announcements to and communicating with various rooms.

ADDITIONAL FEATURES

Provision for remote volume control, particularly important for auditorium use. • TUNING RANGE OF RADIO: 540-1720 kcs.—49, 31, 25 and 19-meter bands, each on individual Super-Band-Spreader dial strips for ease of tuning • VICTROLA: With feather-touch crystal pick-up, true-tracking tone arm and constant speed motor • CABINET: Fine heart and butt walnut veneers combine to provide a most distinctive piece of furniture • SIZE: 42 inches long, 18¾ inches high and 14¾ inches deep.

RCA VICTOR PORTABLE SOUND SYSTEM

For audiences up to 2000 the RCA PG 112-C Portable Sound Equipment illustrated above is unequalled. Attractive in price, flexible in operation, it is well adapted to the needs of the average school. Two input positions with separate volume control for each, together with tone control, provide the utmost in convenience and simple operation. Phonograph input facilities provide for mixing voice with musical background.

Two heavy-duty permanent magnet loudspeakers, a standard RCA Junior Velocity Microphone, complete with chromium plated desk stand and long inter-connecting cables, provide a complete unit ready for instant use. This represents but one of a series of portable systems available.

RCA VICTOR ALL-ELECTRIC BELLS

Available in 5- and 26-note units. Either of these new RCA Victor All-Electric Bells can be played through the Master-Control Sound Systems or through any RCA permanent or portable sound amplification system.

These bells produce notes of marvelous tonal quality, comparing favorably with that obtainable from a series of heavy and extremely costly bells.

For more detailed information concerning RCA Sound Equipment use the inquiry card (inside back cover). Send for this new catalog describing more fully these and dozens of other sound products.

16" DELUXE TURNTABLE FOR RECORDING ATTACHMENT

The RCA two-speed turntable below, fills a definite need in schools for a high quality portable unit capable of handling up to 16" records. May also be used for making recordings through the Master Control Sound Systems, RCA Victor portable public address units and other comparable sound equipment when equipped with RCA recording attachment.

VICTOR RECORDS FOR SCHOOLS

A background of 40 years of experience in developing Victor Records for use in thousands of schools has given the Educational Department of the RCA Manufacturing Company a thorough knowledge of the requirements for Victor Records among schools for the teaching of music, music appreciation, and other subjects. Many special recordings have been prepared.

Today, in practically every subject taught, from kindergarten through college, Victor Records are being utilized to quicken the interest and broaden the knowledge of millions of pupils.

The following special recordings, released during the past few months, are good examples of four of the many types of Victor Records available for school use.

"ABE LINCOLN IN ILLINOIS"

Raymond Massey

Album M-591

Many teachers of speech and dramatics have found that recordings of passages from famous plays and literature provide an excellent method of developing student interest. Such recordings as "Abe Lincoln in Illinois," by Raymond Massey, can be used as models for correct speech and enunciation, and are excellent as professional dramatic portrayals of characters from plays and literature. The study of these records and other speech recordings will prove of untold value to the students of English, speech or dramatics.

FOLK SONGS OF CENTRAL EUROPE

The Trapp Family Choir

Album M-586

Much can be learned of the habits, customs and lives of the peoples of other countries through the study of their folk music. The Trapp Family is especially noted for its simple and lovely interpretations of folk music and early choral music, as illustrated in this album of Folk Songs of Central Europe. Many additional recordings of folk songs from countries all over the world are found in the general Victor Record catalog and the catalog of Victor Records for Elementary Schools.

BRIDE OF THE WAVES

Herbert L. Clarke
Ecstasy—Leonard B. Smith
Cornet with Piano Accompaniment
No. 26389

Every boy who wants to play the cornet in the school band or orchestra will find this virtuoso performance of inestimable value. This and other band and orchestra recordings in the Victor Record catalogs give young musicians an opportunity to study and imitate again and again the performances of the world's greatest artists. They hear professional interpretations of each composition and, accordingly, have a goal toward which to strive.

"SONGS UNDER THE SAILS"

Narration with Singing

Album BC-8

This album illustrates the Work or Occupation songs used extensively in the elementary music and social studies classes today. These songs relate to the various types of occupations in which men are engaged. This set of records tells the story of the voyage of a "clipper" ship and the songs the sailors sing as they perform their duties on board. Many other types of occupational songs are listed in the catalog, Victor Records for Elementary Schools.

RCA Victor MUSIC APPRECIATION BOOKS AND CATALOGS . . . and

The complete Victor Record Service includes catalogs and other publications for the use of teachers and supervisors. The majority of these publications have become standard among schools and are revised regularly to keep them strictly up to date.

New Catalog Entirely Devoted to Records for Elementary Schools

The NEW Catalog of Victor Records for Elementary Schools, illustrated at top right, is a distinct departure from the catalog which has been used for the past few years. The earlier catalog contained lists of records for use in all schools, from kindergarten through college and conservatory. Many of the listings for high schools and colleges appeared also in the General Record Catalog.

The new Elementary Catalog contains *complete listings* of records for *elementary schools only*.

"Victor Record Catalog" for High Schools and Colleges

The latest general catalog of Victor Records contains the listings and special classifications for high school and college use, many of which will be found in the Red Seal section. This arrangement thus avoids much duplication of listings in the two catalogs and increases the usefulness and convenience of each.

Text and Reference Books

These books are used extensively by schools for they contain pertinent discussions of music and composers, and are written in a language understandable by all who are interested in music.

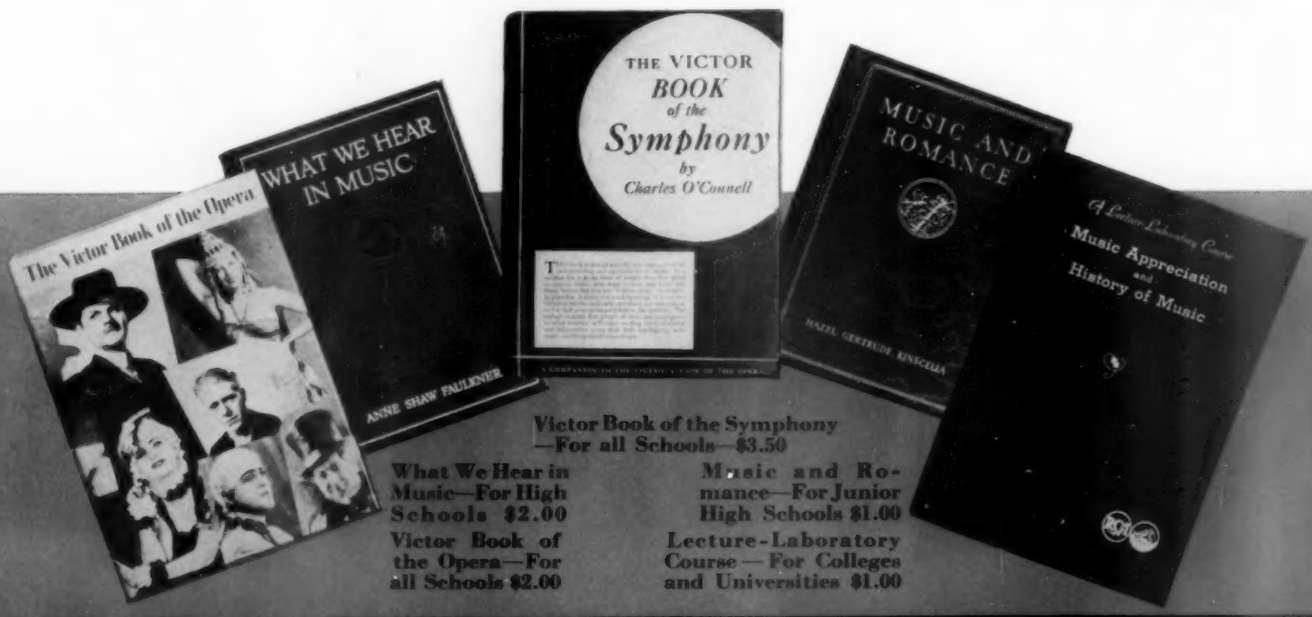
The catalog, Victor Records for Elementary Schools, contains lists of Victor Records which have been recorded for the use of the music teacher or supervisor — arranged in convenient form for ready reference.

This larger catalog of Victor Records is a veritable encyclopedia of recorded music, including the outstanding works of leading composers, recorded by the world's leading artists and musical organizations.

NEW!

Completely Revised 1939 Edition

This book, "Music Appreciation for Children," was written by Dr. Frances Elliott Clark, for forty years an outstanding authority on organized music education. It outlines a course of ear-training for children from six to twelve years of age—$1.25.


The Victor Book of the Opera
WHAT WE HEAR IN MUSIC
ANNE SHAW FAULKNER
THE VICTOR BOOK of the Symphony by Charles O'Connell
MUSIC AND ROMANCE
HAZEL GERTRUDE KINSCELLA
A Lecture-Laboratory Course in Music Appreciation and History of Music

Victor Book of the Symphony —For all Schools—$3.50

What We Hear in Music—For High Schools $2.00

Music and Romance—For Junior High Schools $1.00

Victor Book of the Opera—For all Schools $2.00

Lecture-Laboratory Course—For Colleges and Universities $1.00

STANDARD TEXTS BASED UPON VICTOR RECORDS

The preparation of Victor Records to illustrate standard texts is a major function of the RCA Victor Educational Department. Such recordings are made under the supervision of authors and publishers, thus assuring appropriate treatment of each composition.

This service has been particularly valuable to schools because Victor Records provide many of the finest possible *specific illustrations* of musical types, forms and compositions. There are, in fact, practically no public and very few private schools which would be able to provide such illustrations except through the use of records.

Text and Reference Books

The text and reference books pictured below are but a few of those which require Victor Records for effective demonstration. RCA Victor has prepared Victor Records for use with these and other texts used to teach music and music appreciation. Furthermore, there is scarcely a city, town or village in the entire United States which does not have quick access to Victor Records. Should you have any difficulty in obtaining the records designated in these standard texts and those mentioned in the RCA Victor books on the opposite page, write the Educational Department, RCA Manufacturing Co., Inc., Camden, N. J.

Recording Facilities

The recording facilities of RCA Victor (Recording Studios in New York, Chicago and Hollywood) are available for the private use of any school or school system. Schools or other organizations may use the RCA Victor studios and laboratories. The customary moderate charge for this service will be furnished on request.

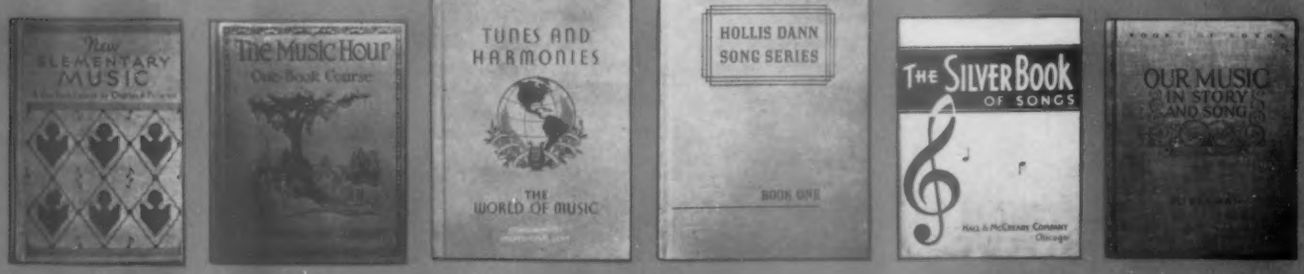
RCA Victor Reference Books

This page and the two preceding, describe very briefly the Victor Record and related services which are available to make teaching more effective. The following books are recommended for constant reference:

1. The Catalog, "Victor Records for Elementary Schools"
2. The General Catalog of Victor Records
3. The Victor Book of the Opera
4. The Victor Book of the Symphony
5. What We Hear in Music
6. Music and Romance
7. Music Appreciation for Children

For more specific recommendations particularly suited to your requirements, write to the Educational Department, RCA Manufacturing Co., Inc., Camden, N. J.

Build A Record Library

All schools should have facilities for convenient and protected storage of records. RCA Victor Record Cabinets provide this and enable schools to build an orderly, convenient and attractive library of Victor Records.

NEW RCA VICTROLAS DESIGNED

FOR MUSIC ROOM

And Wherever Highest Quality of Reproduction is Desired

A prime necessity in the music rooms of every school is a Victrola capable of reproducing clearly and distinctly the full beauty found in Victor Higher Fidelity recordings. RCA Victrola Model R-98 was designed expressly for schools to meet these requirements. Enthusiastic school principals, supervisors and teachers report that for volume, ease of operation, clarity of reproduction and price, this instrument is unsurpassed. Its many features which assure the highest quality of reproduction include a new automatic on and off switch, governed induction motor, improved crystal pickup, 8-inch Electro-Dynamic speaker, and a high quality 5-tube amplifier. When considering a quality Victrola for your music room, you will find that Model R-98 meets all your requirements.

R-98
PORTABLE VICTROLA

DESIGNED TO PROVIDE PERFORMANCE WHICH MEETS THE EXACTING REQUIREMENTS OF SCHOOLS OF ALL SIZES

ESPECIALLY FOR SCHOOLS

RCA Portable Victrola O-19

For schools and school rooms which do not have electric outlets, RCA Victor has available several models of spring-wound Victrolas. One of them, the Model O-19, is illustrated at the left. This instrument plays 10-inch and 12-inch records with sufficient volume for the classroom. It includes such RCA features as covered needle cup, storage space in cover for 10-inch records, turntable speed control, and sound box clip to protect needle and arm while instrument is being carried. Light and portable, it is a very practical Victrola for school use.

FOR THE AUDITORIUM

The choice of the proper Victrola for the school auditorium depends to a large degree on the seating capacity of the room. It is generally desirable also to select an instrument which includes radio reception as well as record reproduction. RCA Victor has available many instruments from which to choose—Victrolas which will give life-like reproduction of both radio and records in your auditorium. These instruments include such outstanding features as the famous RCA automatic record changer for 10-inch and 12-inch records; Protecto Tone Seal for improved tone quality; new and improved crystal pickup; American and foreign radio reception. Many models include storage space for records also. For a complete description of the many instruments available, see your local RCA Victor dealer or distributor, who will be glad to demonstrate and recommend the proper equipment for your needs.

RCA VICTROLAS (WITH RADIO)

FOR SCHOOLS OF ALL SIZES

RCA Victrolas with radio and RCA Victor Radios open up a vast and fascinating world of material for enriching the school curriculum.

Importance of Radio to Schools Steadily Increasing

Whether it is today's amazing drama of history in the making, broadcast from the world's capitals—or the many valuable educational and cultural programs now on the air—radio is becoming more and more important in the plans of a modern school.

Varied Requirements

The requirements of a large city school, of course, differ greatly from those of a small rural school without electricity. But, whatever your requirements, you will find exactly what you need among the many new RCA Victor radios. From high-quality, low-priced table models for the classroom to magnificent consoles for auditorium use, RCA Victor provides an almost unlimited choice to meet every school situation.

See Your RCA Victor Dealer for a Demonstration

It is not possible to list and describe on these pages all the RCA Victor receiving sets (AC, AC-DC or battery operated) which are suitable for use in schools; but the sketches below show the representative types in each of which there are many different models. Your RCA Victor Dealer is ready to recommend and demonstrate the instruments most desirable for any situation.

Have Your Radio and Sound Equipment Inspected Periodically

No radio or sound equipment is better than the condition of its parts—particularly its tubes. And, inasmuch as the loss in the efficiency of tubes is gradual, the difference in performance of the equipment from day to day is not always evident to the user, because there is nothing with which to *compare* the sound. However, this gradual loss in efficiency should be checked before an interruption in service occurs.

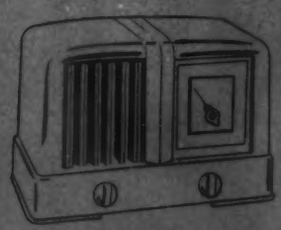
RCA Victor Dealers in all parts of the country maintain servicing facilities in order that you may continue to receive from RCA Victor radio and sound equipment the high level of performance it gave when installed.

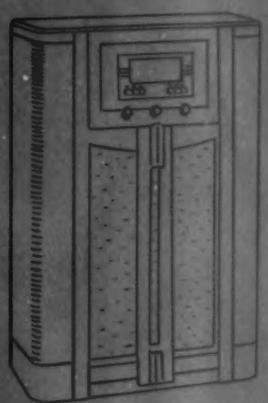
THIS CHECK-UP SHOULD INCLUDE:

1. Check overall set performance for sensitivity, selectivity and fidelity.
2. Test and label all tubes.
3. Check speaker and cabinet for rattles.
4. Inspect and test all power connections.
5. Check aerial, ground and lightning arrester connections.
6. Align antenna, detector and oscillator circuits.
7. Adjust dial to normal kilocycle reading.
8. Check causes of extraneous noises.
9. Clean interior of cabinet.

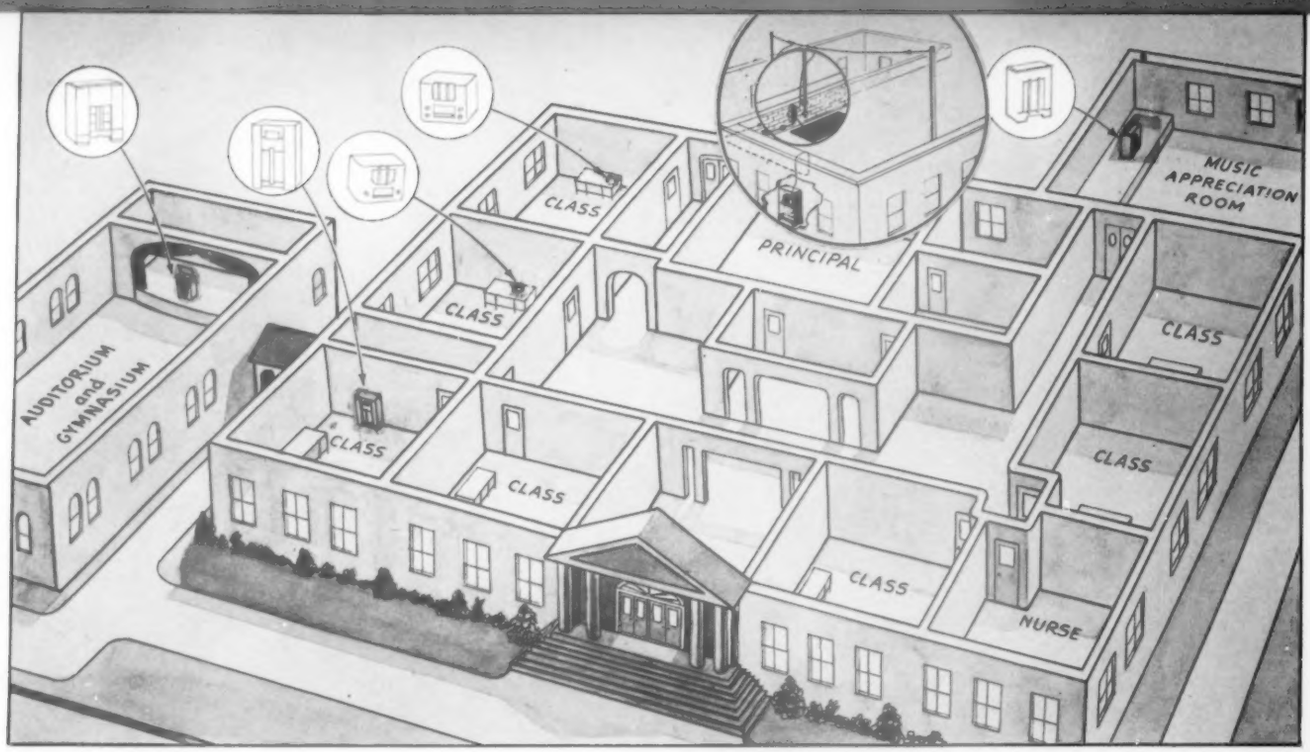
VICTROLAS (WITH RADIOS)

RADIOS (ONLY)





AND RCA VICTOR RADIOS



A RADIO-EQUIPPED SCHOOL IS A BETTER SCHOOL

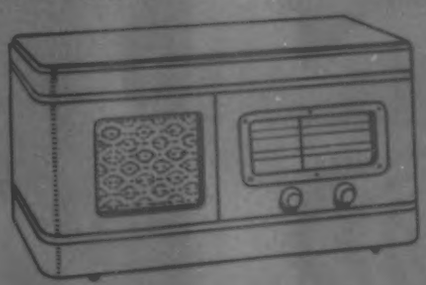
RCA Victor Radio receiving sets and accessory equipment are designed to meet the radio requirements of any school. The above sketch illustrates one up-to-date method of equipping a school with radio receiving instruments and related equipment; namely, RCA Victrolas in the auditorium and music room, with portable radio receivers in the classrooms. A Victrola attachment can be used to play records through these receivers. All may be connected to a single RCA Antennaplex System. Such a system will provide for the simultaneous operation of any number of radio receiving sets in one building.

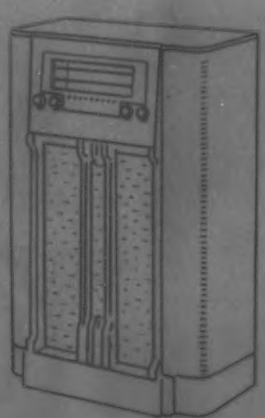
Radios and Victrolas Aid in Teaching

Music Appreciation	Dancing
Musical Instruments	Typewriting
Social Science	History
Current Events	Voice Training
Gymnastics	Literature

RCA Victor Antennas
INSURE PROPER RECEPTION
They are available to meet the requirements of any situation.

BATTERY-OPERATED RADIOS





SKETCHES TO THE LEFT REPRESENT TYPES ONLY

RCA Victor Victrolas and Radios are offered in a range of styles and prices to meet every requirement.

RCA 16 mm. SOUND MOTION PICTURE PROJECTOR

Extreme Portability—with projector case designed for easy carrying — projector case weighs 39 pounds, speaker case 18 pounds, fully equipped.

RCA presents a new 16 mm. Sound Motion Picture Projector designed by the same RCA engineers who for years have been pre-eminent in the production of high quality film recording and reproducing equipment for theatrical use. This RCA projector incorporates the latest developments and improvements in sound-on-film reproduction, including many exclusive features. For classroom or auditorium use, you will find this projector unexcelled in ease of operation, brilliant projection, and clear, life-like sound. Use the card attached to the opposite page to request a copy of the new catalog. A demonstration will be arranged if requested.

FEATURES

1. *Brilliant Projection*—using specially designed optical system and large objective lens (f.1.65) providing 10% to 20% greater screen illumination with 750-watt lamp.
2. *RCA Photophone Sound* with a maximum of 10 watts push-pull amplification—sufficient volume for classroom or average auditorium.
3. *Simplified Threading*—as easy to thread as a silent projector and made more simple by casting the threading line on the projector block.
4. *Theatrical Framing*—new type double-claw intermittent eliminates up and down movement of picture area on screen. Keeps film in center of most efficient light. No change of projector position while framing.
5. *Efficient Cooling*—specially designed blower scroll, cools lamp, amplifier and aperture gate. Lamp house barely warm while in operation. Life of lamp increased. Lamp may be removed quickly and easily.
6. *Motor Take-up and Rewind*—separate motor eliminates spring belts and assures equal tension on 400, 800, 1200 and 1600 foot reels. Simple and rapid rewind of all sizes of reels.
7. *Shock Proof Stabilizer*—between take-up reel and lower sprocket, greatly reduces magnitude of jerks, uneven pull, etc.
8. *Sound Optical Units*—mounted on single casting for rigidity with swinging bracket for easy cleaning of optical units and quick change of exciter lamp.
9. *Stabilized Sound*—using sound drum stabilized by large solid flywheel, with complete assembly running in shielded ball bearings.
10. *Electro-Dynamic Speaker* — providing best balanced reproduction of speech and music.
11. *Easy Cleaning*—of aperture gate, condenser lens and adjustable reflector, to provide most efficient operation at all times.
12. *Two-Speed Operation*—at 24 frames for sound and 16 frames for silent films, with governor controlled motor and toggle switch for changeover.
13. *Ease of Operation*—controls centrally located.
14. *One Point Lubrication*—on high speed parts. Permanently lubricated journals throughout.
15. *Input Jack*—for using high impedance microphone or Victrola Attachment with magnetic or crystal pick-up. Speech input may be used with either sound or silent films.
16. *Standardized Lamps*—pre-focused base projection and exciter lamps available anywhere at standard prices.
17. *Variable Tone Control*—providing the best reproduction of both speech and music.

Accessories

A complete assortment of accessories to be used with the RCA 16 mm. Sound Motion Picture Projector may be obtained through the RCA Victor distributors who demonstrate and sell this equipment. These accessories include various sizes of projection lenses, reels and cans, projection lamps, screens, rewind and patching equipment, etc. Many items of supplementary equipment are also available for use with the projector, such as RCA Microphones and Record Players.

Send for your free copy of the booklet illustrating the RCA 16 mm. Sound Motion Picture Projector and accessories. Use the card on the opposite page.

LABORATORY AND TEST EQUIPMENT FOR SCHOOLS

RCA Equipment for School Laboratories

To meet the needs of a growing number of schools offering courses in science, radio and electrical engineering, RCA Victor offers a complete line of scientific radio and electrical test equipment for laboratory use. These instruments are the products of years of experience and research by RCA Victor engineers, and are used in the radio and television research laboratories of RCA Victor, the largest of their kind in the world. They are also used in Radio Schools and by Radio Servicemen in all parts of the world.

5" Standard Cathode-Ray Oscillograph No. 160

New 5" cathode-ray tube affording large, clear trace; graduated viewing screen permitting direct measurement of deflection amplitudes.

Freq. Characteristic Vert. Amp. (gain max.) 3 cycles-50 kc. essentially flat.

Freq. Characteristic Horiz. Amp. 5 cycles-100 kc. essentially flat

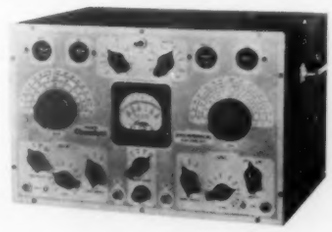
Horizontal Sweep Voltage 4 cycles to 22,000 cycles

Ultra-Sensitive D-C Meter No. 9819

An extremely sensitive portable instrument for accurate measurements of current, voltage, and resistance in d-c circuits of low current values.

Sensitivity greater than that of any portable meter of the pivot or suspension type, the most sensitive range giving a deflection of one scale division (over 1/16") with a current of 0.0004 micro-ampere.

The Rider Chanalyst



Of particular interest to schools is this new RCA instrument. It is designed to locate *quickly* the source of troubles in faulty radio receivers. It does this by *tracing the signal* from where it enters the radio receiver (the antenna) right through the set to the loudspeaker.

The Rider Chanalyst is particularly useful in explaining the *operation* of a radio receiver—for, in tracing the signal, which is visually indicated by the Chanalyst, the student is able to follow the course of the signal *right through* the receiver and thus better understand *how* a receiver works. Used in connection with an RCA Oscillograph, it enables the student to actually *see* the wave form of the various currents and, therefore, more clearly understand the circuits and their functions.

Complete Catalogs of RCA Laboratory Equipment and Parts

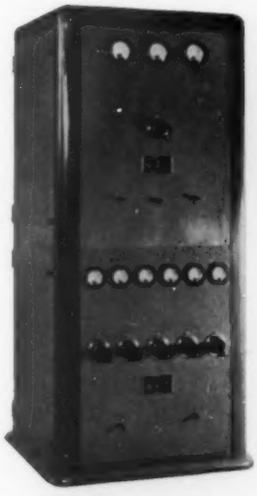
Due to space limitations only three of the many useful RCA instruments are mentioned here. Dozens of others are described in these two new catalogs which are available upon request. Write the Educational Department, RCA Manufacturing Co., Inc., Camden, N. J.

RADIO AND TELEVISION TEST EQUIPMENT
(*Parts and Accessories*)
RCA Measuring Equipment

U.H.F. BROADCAST AND RECEIVING EQUIPMENT FOR SCHOOLS

The newest and most far-reaching development in modern educational methods is the use of a centrally located ultra-high frequency school broadcasting station for transmitting announcements and educational programs of all kinds to schools within a city or county school system.

A complete installation includes a transmitter and studio equipment in the central station, including microphones, control equipment, amplifiers, transcription turntables, etc. Each school in the system requires an ultra-high frequency receiver—which may be integrated with a centralized sound system for distribution of programs to all rooms in the school. For more detailed information on the RCA Victor equipment available for a complete system, write to the Educational Department, RCA Manufacturing Company, Inc., Camden, N. J.



A typical RCA Transmitter of great fidelity, efficiency and reliability.

NATIONWIDE SALES AND SERVICE

RCA VICTOR DISTRIBUTORS

ALABAMA	Birmingham
ARIZONA	Phoenix
ARKANSAS	Little Rock Texarkana
CALIFORNIA	San Francisco Los Angeles Hollywood
COLORADO	Denver
CONNECTICUT	Bridgeport Hartford
D. C.	Washington
FLORIDA	Tampa Miami Jacksonville
GEORGIA	Statesboro Atlanta
IDAHO	Boise
ILLINOIS	Peoria Chicago
INDIANA	South Bend Indianapolis Evansville
IOWA	Cedar Rapids Sioux City Davenport Des Moines
KANSAS	Wichita
KENTUCKY	Louisville
LOUISIANA	New Orleans Shreveport
MAINE	Portland
MARYLAND	Baltimore
MASSACHUSETTS	Cambridge Springfield
MICHIGAN	Escanaba Saginaw Detroit Grand Rapids
MINNESOTA	Minneapolis
MISSISSIPPI	Jackson
MISSOURI	St. Louis Springfield Kansas City
MONTANA	Billings
NEBRASKA	Omaha
NEW JERSEY	Newark
NEW YORK	Newburg New York Buffalo Rochester Albany Binghamton Syracuse Buffalo
NORTH CAROLINA	Charlotte
NORTH DAKOTA	Fargo
OHIO	Akron Toledo Columbus Canton Akron Cleveland Youngstown Cincinnati Springfield Dayton
OKLAHOMA	Oklahoma City
OREGON	Portland
PENNSYLVANIA	Pittsburgh Harrisburg Williamsport York
PENNSYLVANIA Cont'd.	Johnstown Altoona Philadelphia Erie
RHODE ISLAND	Providence
SOUTH DAKOTA	Sioux Falls
TENNESSEE	Chattanooga Nashville Knoxville Memphis
TEXAS	Dallas Amarillo Corpus Christi El Paso Houston San Antonio
UTAH	Salt Lake City
VERMONT	Burlington
VIRGINIA	Richmond
WASHINGTON	Seattle Spokane
WEST VIRGINIA	Wheeling Charleston
WISCONSIN	Milwaukee Madison

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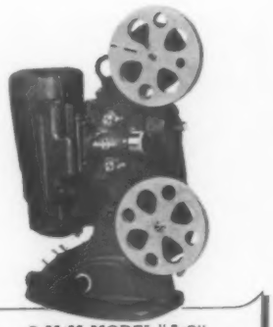
BOSTON, MASS., NEW YORK CITY, N. Y., ATLANTA, GA., CLEVELAND, OHIO, CHICAGO, ILL.,
KANSAS CITY, MO., DALLAS, TEXAS, SAN FRANCISCO, CALIF.

Form 18-1453

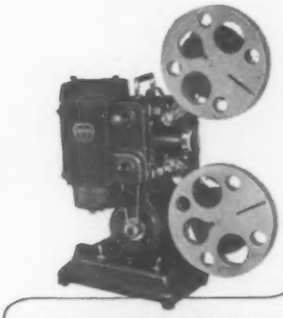
Printed in U. S. A.

AMPRO CORPORATION

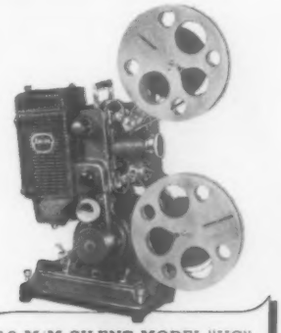
2839 N. Western Avenue, Chicago, Ill.



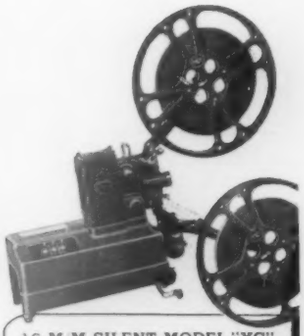
8 M/M MODEL "A-8" HOME MOVIE PROJECTOR
500 Watt Illumination. Reverse—400 Ft. Reel Capacity $98



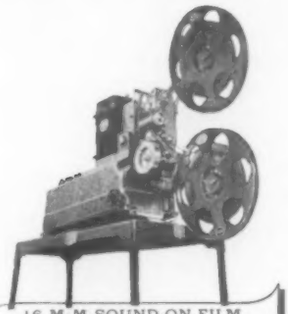
16 M/M SILENT MODEL "KD"
750 Watt Illumination. F1.6 Lens—Reverse and Stills . . $135



16 M/M SILENT MODEL "UC"
750 Watt Illumination. "Convertible into Sound Models UA and UAB" $175

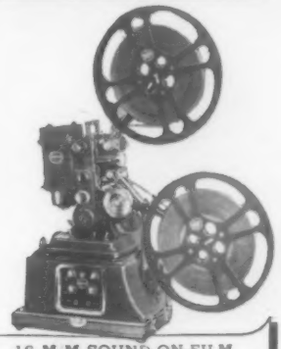


16 M/M SILENT MODEL "YC"
750-1000 Watt Illumination. "Convertible into Sound Model YSA." 1600 Ft. Reel Capacity . . $195

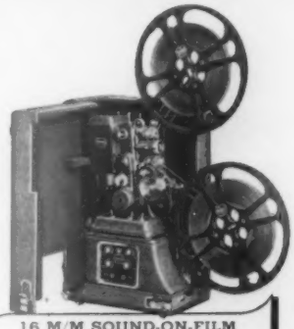


16 M/M SOUND-ON-FILM MODEL "XA"
750-1000 Watt Illumination. Mic. or Phono. Mixing with Sound. Sound Speed Only. $275

16 M/M SOUND-ON-FILM MODEL "YSA"
Silent-Sound Speeds—Mixing, Reverse, Still Pictures $320
Model "YA", without Reverse-Stills $295

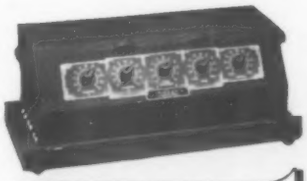


16 M/M SOUND-ON-FILM MODEL "UA"
750 Watt Illumination. Mic. and Phono. Mixing with Sound. Still Pictures and Reverse $345

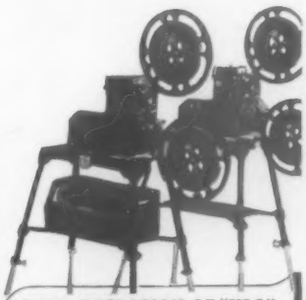


16 M/M SOUND-ON-FILM MODEL "UAB"
Same as Model "UA" but enclosed in **Sound-Proofed** Blimp Case. $365

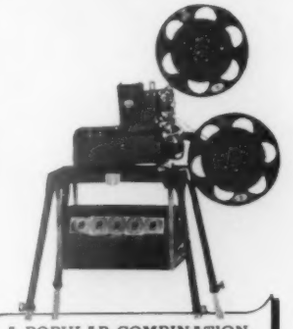
16 M/M AMPRO-ARC SOUND-ON-FILM MODEL "AA"
$1210



TRI-PURPOSE PUBLIC ADDRESS SYSTEM, MODEL PA-1
Provides Vol. for Audiences up to 10,000. **Amplifier only** . . $145



DUAL OPERATION OF "YSA" With TRI-PURPOSE AMPLIFIER
Mounted on Ampro Projector Stands



A POPULAR COMBINATION
Low Priced Classroom Model with Tri-Purpose Amplifer and Projector Stand

A *PRECISION* PROJECTOR FOR EVERY PURPOSE

New models and important basic improvements feature the new Ampro line of precision projectors. In Model A-8 Ampro brings for the first time full 16 mm. quality into the popular priced 8 mm. field. Two convertible models now enable the far-sighted purchaser to obtain silent projectors with full provision for later conversion into modern sound projectors. Additional mixing facilities with microphone or phonograph are now available on the increasingly popular Model XA and YSA. In Models UA and UAB there is offered complete flexibility—mixing of sound from film, microphone and phonograph—with adequate range of volume for either classrooms or auditoriums. The new Ampro Tri-Purpose Public Address System alone or in conjunction with Ampro projectors meets a great variety of needs.

In addition to the many outstanding Ampro features—Ampro units incorporate a splendid precision quality that has won for them recognition the world over as outstanding values in the field of motion picture projection. Send for complete catalog giving detailed description of the entire Ampro line.

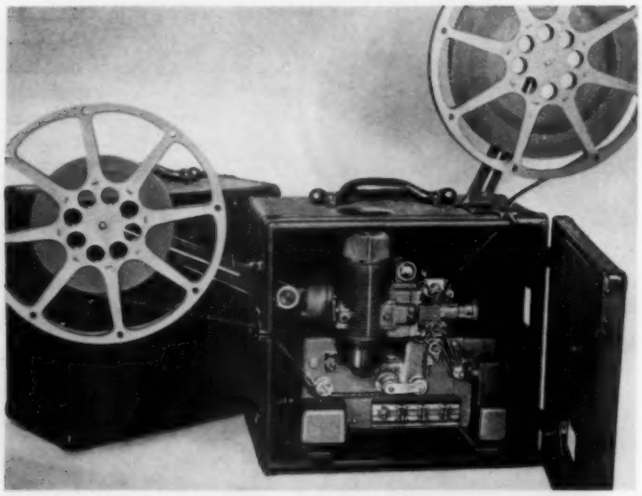
BELL & HOWELL COMPANY

1850 Larchmont Avenue, Chicago

New York Hollywood London

Manufacturers of FILMO *and* FILMOSOUND
Educational, Professional, and Personal Motion Picture Equipment

DESIGNED FOR SCHOOL USE

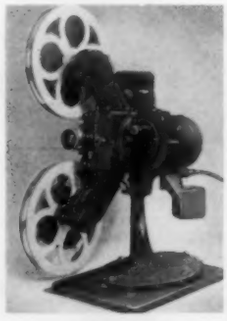


New Filmosound "Academy"

Here is the projector designed for many school uses. It projects both sound and silent films. It serves both classrooms and moderate-sized auditoriums. Permits adding a public address microphone, and a phonograph turntable to provide music for school events. Has "blimp" case for quiet operation, speaker-hiss eliminator, 750-watt lamp, and 1600-foot 16 mm. film capacity. Easily portable in two light, compact cases.

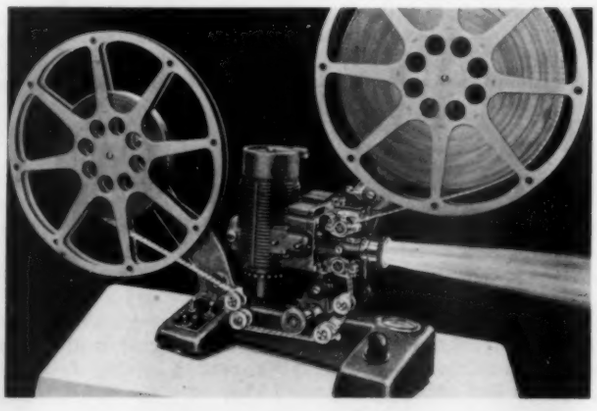
The New Filmoarc

Filmoarc provides the ultimate in screen brilliance and sound volume. Permits use of 16 mm. safety film in largest auditoriums where 35 mm. equipment was formerly needed. Simplified, centralized controls give the same easy operation of smaller Filmosounds.



New Filmo-Master!

A new and completely gear-driven 16 mm. silent projector offered at a very low price. Embodies de luxe features heretofore found only in higher-priced Filmos. Its 750-watt lamp, fast F 1.6 lens, and Magnilite condenser assure bright movies in classroom or small auditorium. Has speedy power rewind, other features.



New Filmo Showmaster

Provides brilliant pictures and uninterrupted hour-long silent film programs in classroom or moderate-sized auditoriums. Has 1600-foot film capacity, 750-watt lamp, fast F 1.6 lens, speedy power rewind, provision for reverse and still projection, and many other features. Write for full details.

PRE-TESTED

Time and time again, when schools have conducted careful, impartial tests before purchasing, Bell & Howell Projectors have been selected. Designed especially for school use by the same engineers who since 1907 have created Hollywood's professional movie equipment, Filmo Silent and Filmosound Projectors for schools are built with the same precision and lifetime materials, to give the finest picture and sound reproduction.

SIMPLICITY

Bell & Howell Projectors are simple to operate. Filmosound "Academy," at left, can be set up and put in operation in less than three minutes. Even a child can operate it!

FILM SAFETY

Every B&H Projector incorporates complete safeguards for film protection. No scratching, no tearing—film always travels in a straight line without twists.

TERMS AVAILABLE

Remember that the first cost of a movie projector is not so important as the cost per year of dependable service. In the long run, a Bell & Howell will cost you less. Buy now on easy terms.

16 MM. SOUND FILM LIBRARY

Bell & Howell visual education service does not stop with supplying fine projectors. Schools find the great, fast-growing, B&H Filmosound Library the ideal film supply source.

The new Filmosound Library Catalog classifies, under headings corresponding to classroom subjects, more than 1400 fine sound films. Each is adequately described, and evaluations by educational authorities are indicated. There are hundreds of classroom shorts. For assembly or P.T.A. programs, there are over 250 outstanding features, including recent Hollywood hits.

Each film is selected and especially edited for school use. Every film arrives in prime condition, *direct* from Bell & Howell. Rental rates are moderate, and savings up to 50% may be made by booking a year's schedule in advance.

Write for information on Bell & Howell Projectors, sound or silent, and on available films for school use.

VICTOR ANIMATOGRAPH CORPORATION

Davenport Iowa

DISTRIBUTORS THROUGHOUT THE WORLD

+ ADD AN INTEGRAL SPEAKER
+ ADD AN AMPLIFIER
+ ADD MULTIPLE SPEAKERS
+ ADD A PUBLIC ADDRESS SYSTEM
+ ADD A CENTRAL RADIO SYSTEM
+ ADD A RECORD TURNTABLE
+ ADD A RECORDING UNIT

Victor marks a new era

IN SOUND PROJECTOR UTILITY

THE NEW VICTOR Series 40 Animatophone contains all the industry has strived to achieve since the advent of the 16mm sound film. Its Add+A+Unit features make available a multiplicity of uses heretofore requiring several different types and sizes of projectors. These features make it economically adaptable to public address service, phono-record reproduction, radio amplification, and sound recording — and only the Victor Animatophone provides all these Add+A+Unit features. Truly the motion picture projector of today and tomorrow.

This 16mm Sound Motion Picture Projector is so compact, so easily portable, and so brilliant in performance that it is destined to become the standard of comparison.

Likewise, new standards of performance have been achieved with unsurpassed quality of sound and simplicity of operation. Your request will bring complete catalog information.

DeVRY CORPORATION

New York Hollywood Chicago

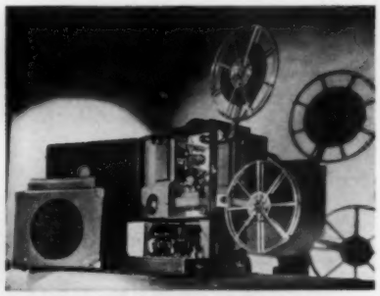
Manufacturer of the Largest and Finest Line of Motion Picture Sound Equipment in the World

GENERAL OFFICES AND MAIN PLANT

1104 Armitage Ave., Chicago, Ill.

Plant No. 2
2535 N. Ashland Avenue

DeVRY Almost Human "INTERPRETER" 16 MM. PROJECTOR



The ideal all purpose school projector for audiences up to 1000. Theatre quality pictures and sound. Has exclusive DeVry features that eliminate irritating projector stops. 1600 ft. reel capacity for hour long silent programs, 45 minute sound programs. 750, 1000 or 1200 watt lamps.

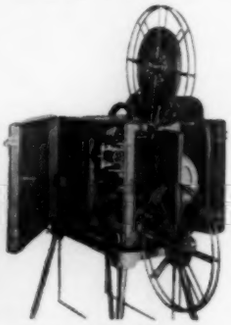
MODEL "Q" PROJECTOR
16 MM. Projector, Speaker and Amplifier, ALL in ONE Case

Embodies all the quality and most of the exclusive features of the "Interpreter". Ample volume for 300. (Booster unit available for larger groups.) 750 or 1000 watt lamp. Sound or Silent Films.

LIGHT WEIGHT

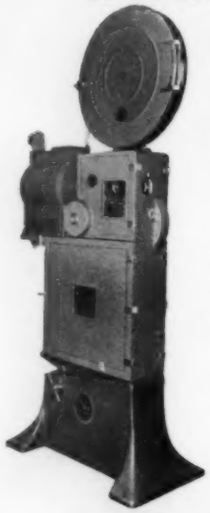
1600 FT. REEL CAPACITY

LOW PRICED



The Model "Q" Weighs less than 50 lbs.

DeVRY SUPER THEATRE PROJECTOR



This peer of all 35 mm. projectors is the best buy for permanent installation in large school auditoriums. Completely streamlined, it offers advantages found in no other unit, PLUS much lower original cost, much lower operating cost and much improved projection.

Like Fine automobiles, DeVry Theatre Projectors Have Silent Chain Drives Instead of Gears — For Greater Smoothness—More Silent Operation

SEMI-PORTABLE THEATRE SOUND PROJECTOR

Suitable for most school auditoriums. Readily portable for easy movement from room to room. Can be set on table or stand at any desired height. Adaptable for regular Hollywood 35 mm. releases. 2000 ft. magazine.

DeVry Semi-Portable

DeVRY PROFESSIONAL 16 MM. ARC LAMP PROJECTOR

Matches the performance of 35 mm. units. Magazine provisions for 4000 ft. of film, the equivalent of 10,000 in 35 mm. Permits a continuous program of one and three-quarter hours with light source capable of delivering a 20 x 24 ft. picture from a distance of over 125 feet from screen. Has theatre type Sprocket Intermittent (rotary) movement.

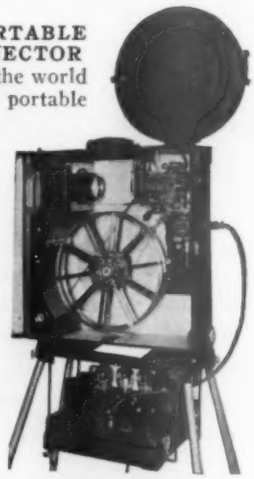
ALL DeVRY PROJECTORS
Have Built-in Provisions for

Centralized Room Speaker System — Silent as Well as Sound Films.

PLUS Exclusive Innovations That Prolong FILM LIFE

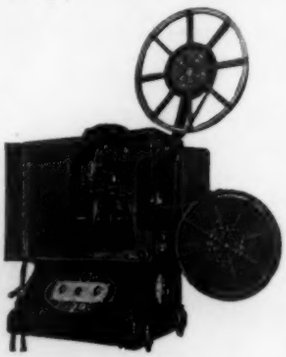
DeVRY ESF PORTABLE THEATRE PROJECTOR

The standard of the world for a light weight portable sound unit handling regular 35 mm. films. Built in two easy-to-carry cases; projector in one, amplifier in the other. 2000 ft. or 1000 ft. magazine capacity.



DeVRY 16 MM. SPROCKET INTERMITTENT SOUND PROJECTOR

The only 16 mm. projector with the rotary action, Geneva type movement. Provides smoother projection and greater protection to film. A **bonded ten year guarantee** on the Sprocket Intermittent mechanism backs our claims of quality, service, and assures perfect performance over a long period of time.



WRITE FOR FREE richly illustrated literature giving complete information on any product listed here. ALSO, booklet on "Values of Audio-Visual Aids in Education" and "Self Liquidating Plan" of special interest to schools which may not have ready projector funds available.

Revised Edition

"FREE FILMS FOR SCHOOLS"

A 64-page booklet listing over 1400 films, name of sponsor or distributor, whether it is 16 mm. or 35 mm., sound or silent. Sells for 50¢ — and worth it!

DeVRY 16 MM. SOUND CAMERA

Variable area camera for single and double system recording. 400 ft. silenced film magazine. Easily portable, amplifier in one case, power supply in another. Precision built throughout.

BAUSCH & LOMB OPTICAL COMPANY

655 St. Paul Street, Rochester, N. Y.

New York Chicago Boston Los Angeles San Francisco
London, England Frankfurt A/M, Germany

BDT BALOPTICON—For Slides Only

This extremely popular model is inexpensive, sturdy in construction, compact, easily portable and highly efficient. Its optical system is of exceptionally high quality and (depending on the lamp and lens used) can be used at distances from 4 to 80 feet from the screen. Image sizes range up to as large as 10 feet on the longer side. Maximum illumination. Extremely simple to operate. Still film, micro-projector and overhead projector attachments are available. The sturdy, tilting base is adjustable in two meridians and permits leveling the Balopticon even when placed on an uneven surface. This mounting allows for changing the projection angle for screen at various heights.

Model B is the same instrument as the BDT but without the tilting base. It is recommended for use where a permanent installation is being made, although it is readily portable.

ERM BALOPTICON —For Opaque Objects

Model ERM Balopticon is used to project opaque objects only. For that reason, economy is one of the major advantages of this projector. Photographs, pages or pictures from books, charts, drawings, actual objects such as botanical specimens are all excellent materials for this projector. Projects a 6″ square area of object but pages, charts, etc., up to 14″ can be accommodated. Specially designed parabolic reflector produces an unusually bright shadow-free image from a 500 watt lamp. Excels any projector with similar light source offered today.

Model LRM is arranged to project both opaque objects and lantern slides. This instrument allows you material available for both types of projection.

SEND FOR CATALOGS

Catalog E-11, "Balopticons and Accessories," completely describes our line of Balopticons, many of which were omitted here due to lack of space. Micro-Projectors for school and college use are the subjects for Catalog E-20. For information on Bausch & Lomb Microscopes and Spectrographs see page 513 of this book.

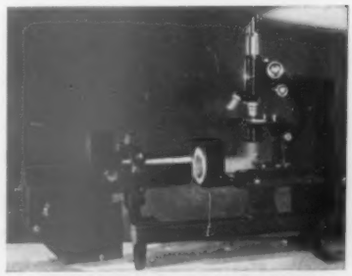
KOSB BALOPTICON —For Translucent Screen Projection

This projector is placed behind a translucent screen and the image is seen on the other side. It is especially designed for class room work for the teacher faces the class, standing by the screen and lecturing on the subject matter illustrated. So simple to operate that the teacher does not require an assistant. So powerful is the illumination that room can be left light enough for note taking. Projects opaque material up to 6″ x 6″ or a 6″ square section of a larger object. Projects standard size lantern slides. Strip film attachment available. Blower keeps interior of projector cool at all times. Easily portable.

OVERHEAD PROJECTOR ATTACHMENT —(For Use with Models B and BDT and KOSB)

This ingenious accessory permits the teacher to operate his own Balopticon and face his class. The image is thrown on a screen back of and over the head of the teacher. Teacher can point to objects on slide with pencil—image of pointer appears on the screen. A most efficient teaching aid and a great time-saver.

MODEL B MICRO-PROJECTOR



Now Bausch & Lomb offers a new Micro-Projector at a new low price. Any standard compound microscope can be used.

Simply place the microscope on the stage of the projector in an upright position, apply the prism reflector cap to the microscope and focus the illuminator. Complete directions accompany each projector.

Investigate this new instrument before completing your plans for science laboratory development.

TRIPLE-PURPOSE MICRO-PROJECTOR

Especially designed and priced for high schools, this extremely efficient unit serves three definite purposes—(1) projection of permanently mounted specimens on a screen from 4 to 15 feet away. (2) making drawings of microscopic fields. (3) projection of living specimens in liquids. Exceptionally sturdy in construction. Has both coarse and fine focusing adjustment. A two-power projection lens is included.

BALOPTICON TABLE

The B & L Balopticon Table provides a means of placing a Balopticon where it can be used to best advantage. It is portable (rollers on two front legs), and has a shelf underneath for slide boxes.

SPENCER LENS COMPANY

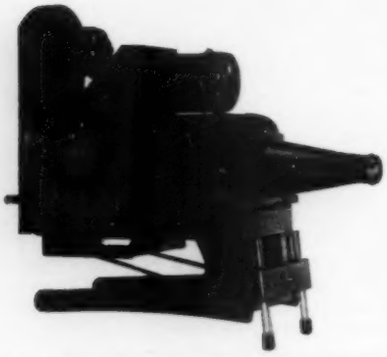
Buffalo, New York

Manufacturers of

Microscopes—Microtomes—Optical Measuring Instruments
Delineascopes—Photomicrographic Cameras

BRANCH OFFICES

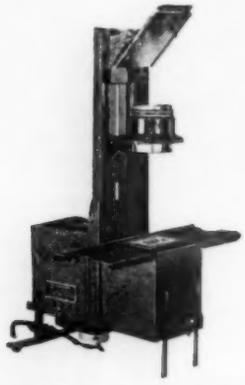
New York . . Chicago . . Washington . . Boston . . San Francisco . . Los Angeles . . Dallas . . Columbus . . St. Louis . . Philadelphia



COMBINATION CLASSROOM DELINEASCOPE

This Model VA Delineascope projects both lantern slides and opaque objects. It projects postcards, photographs, drawings, pages in books, mineral and biological specimens. The back of the instrument is open so that illustrations in books of large size may be projected. An improved elevating device facilitates centering the picture on the screen. Furnished with or without cooling fan. A filmslide attachment may be added.

Model V Delineascope is available for opaque projection only.



SCIENCE DELINEASCOPE

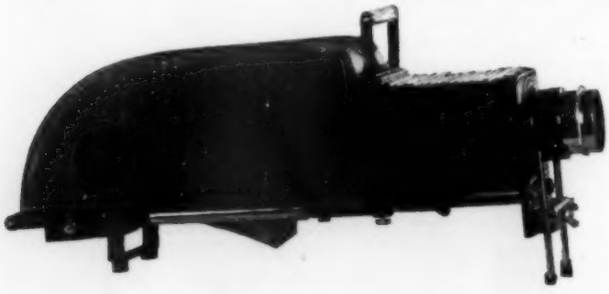
Spencer Model B is designed for lecture table use and projects glass slides, materials in Petrie Dishes or other transparent objects from a horizontal platform. Numerous scientific experiments such as magnetic lines of force, surface tension, mechanics, electrolysis, etc., can be effectively dramatized by projection to the entire class. This eliminates large, cumbersome and often expensive experiment set-ups.

The action of drawing or writing with a pencil on a ground glass slide can be projected. The shadow of any small pointer may be projected on the screen which is above and behind the lecturer.

DELINEASCOPE
(for 2″ x 2″ slides)

Available as 300-watt, 200-watt or 100-watt instruments, this moderate priced group of Spencer Delineascopes (Models MK, MK-2 and MK-3) is noted for an extraordinary brilliance of screen illumination. Film safety is assured by a well ventilated lamphouse and, in the more powerful models, by heat absorbing glass and a fan cooling unit.

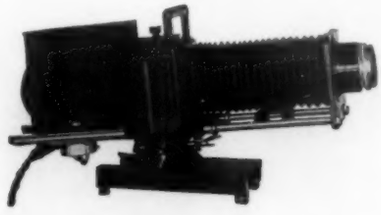
The MK-2 may be converted into a 300-watt model at any time by the addition of the fan cooling unit and a 300-watt bulb. The slide temperature in the 300-watt model is lower than in any other instrument for this type providing such brilliance of illumination.



NEW AUDITORIUM COLOR SLIDE DELINEASCOPE

Details and colors can now be brought to the projection screen in lifelike clarity and vividness with this new 750 watt Spencer Delineascope.

It accommodates both 2″ x 2″ and 3¼″ x 4″ slides and projects a more brilliant image either size than has formerly been obtainable with the average 1000 watt slide projector. An ingenious cooling system provides complete protection against film damage.



CLASSROOM DELINEASCOPE

Spencer Model D, for the projection of glass slides in classroom work, embodies several special features for the convenience of the teacher. It has a non-heat conducting carrying handle; a tilting and elevating device for conveniently locating the picture on the screen; an aperture in the side of the lamphouse to illuminate manuscripts; special optical system to insure remarkably sharp, brilliant pictures. Sturdy, lightweight and extremely portable.

WRITE DEPT. B13 FOR COMPLETE DETAILS ON SPENCER DELINEASCOPES

AMERICAN OPTICAL COMPANY

SOUTHBRIDGE, MASS.

EDUCATIONAL AIDS DEPARTMENTS

Pat. and Pat. Pend.

Reading Instruments

The Ophthalmograph is a portable eye movement camera which furnishes the teacher with photographic records (graphs) of the students eyes—taken while the eyes are at work. It can be operated by anyone after brief instruction. Each test costs only a few cents.

The Metronoscope combines all underlying ideas in methods developed to condition left-to-right control of the eyes as well as methods of short exposure to increase the span of recognition . . . it rhythmically exposes each line of print in three portions at controllable speeds.

Pat. and Pat. Pend.

Complete information concerning these aids to reading can be obtained from any one of the American Optical Co. Branches in the following Cities.

ALABAMA
Birmingham
Gadsden
Mobile
Montgomery

ARIZONA
Phoenix
Tucson

ARKANSAS
Fort Smith
Hot Springs
Little Rock

CALIFORNIA
Bakersfield
Fresno
Long Beach
Los Angeles
Oakland
Pasadena
Sacramento
San Diego
San Francisco
San Jose
Santa Barbara
Santa Cruz
Santa Rosa
Stockton

COLORADO
Colorado Springs
Denver
Grand Junction
Pueblo

CONNECTICUT
Bridgeport
Hartford
New Haven
Norwich

DELAWARE
Wilmington

DIST. COLUMBIA
Washington

FLORIDA
Jacksonville
Miami
Orlando
Pensacola
St. Petersburg
Tampa
W. Palm Beach

GEORGIA
Atlanta
Augusta
Macon
Savannah

IDAHO
Boise

ILLINOIS
Bloomington
Champaign
Chicago
Decatur
East St. Louis
Peoria

INDIANA
Evansville
Fort Wayne
Hammond
Indianapolis
South Bend
Terre Haute

IOWA
Burlington
Cedar Rapids
Davenport
Des Moines
Dubuque
Fort Dodge
Marshalltown
Mason City
Ottumwa
Sioux City

KANSAS
Hutchinson
Salina
Topeka
Wichita

KENTUCKY
Lexington
Louisville
Paducah

LOUISIANA
Alexandria
Baton Rouge
Monroe
New Orleans
Shreveport

MAINE
Augusta
Bangor
Lewiston
Portland

MARYLAND
Baltimore

MASSACHUSETTS
Boston
Brockton
Fall River
Fitchburg
Lynn
New Bedford
Pittsfield
Springfield
Waltham
Worcester

MICHIGAN
Detroit
Grand Rapids
Saginaw

MINNESOTA
Minneapolis
St. Paul

MISSISSIPPI
Jackson
Meridian
Vicksburg

MISSOURI
Cape Girardeau
Columbia
Jefferson City
Joplin
Kansas City
Springfield
St. Joseph
St. Louis

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Butte
Great Falls
Missoula

NEBRASKA
Grand Island
Lincoln
Omaha
Scottsbluff

NEW JERSEY
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Jersey City
Newark

NEW MEXICO
Albuquerque

NEW YORK
Albany
Binghamton
Bronx
Brooklyn
Buffalo
Glens Falls
Hempstead, L. I.
Ithaca
Newburgh
New York
Niagara Falls
Poughkeepsie
Schenectady
Syracuse
Troy
Utica
Watertown

NO. CAROLINA
Asheville
Charlotte
Durham
Greensboro
High Point
Raleigh

OHIO
Akron
Canton
Cincinnati
Cleveland
Columbus
Dayton
Elyria
Mansfield
Toledo
Youngstown

OKLAHOMA
Enid
Muskogee
Oklahoma City
Tulsa

OREGON
La Grande
Portland

PENNSYLVANIA
Allentown
Altoona
Erie
Harrisburg
Johnstown
Oil City
Philadelphia
Pittsburgh

RHODE ISLAND
Providence

SO. CAROLINA
Columbia
Greenville
Spartanburg

SO. DAKOTA
Mitchell
Sioux Falls

TENNESSEE
Chattanooga
Johnson City
Knoxville
Memphis
Nashville

TEXAS
Abilene
Amarillo
Beaumont
Corpus Christi
Dallas
El Paso
Fort Worth
Harlingen
Houston
Lubbock
Paris
Port Arthur
San Antonio
Texarkana
Tyler
Waco
Wichita Falls

UTAH
Ogden

VERMONT
Burlington

VIRGINIA
Bristol
Norfolk
Richmond
Roanoke

WASHINGTON
Seattle
Spokane
Tacoma
Wenatchee
Yakima

WEST VIRGINIA
Bluefield
Charleston
Clarksburg
Wheeling

WISCONSIN
Green Bay
Janesville
Madison
Milwaukee
Oshkosh

WYOMING
Cheyenne

DA-LITE SCREEN CO., INC.

Manufacturers of Theatrical and Non-Professional Screens with All Types of Surfaces and Mountings

Dept. 40 A.S., 2723 NORTH CRAWFORD AVE., CHICAGO, ILLINOIS

DA-LITE

Reg. U. S. Pat. Off.

SCREENS AND ACCESSORIES

Meet Every Projection Requirement

Improve the quality of projected pictures and simplify the showing of visual material by specifying Da-Lite equipment in classrooms or auditoriums. Da-Lite screens are available with White, Silver or Glass-Beaded surfaces and in square or rectangular shapes to meet the special requirements of any conditions of service. The Da-Lite 48 page catalog gives the light reflective qualities of each surface and offers a reliable guide to the selection of the right screen, the right size and the right type of mounting for every need. Da-Lite screens embody the most advanced features and are the result of more than 30 years of specialized experience in screen manufacture.

THE CHALLENGER - *The Most Convenient of All Portable Screens*

Where pictures are to be projected in several locations, the compact, light weight Da-Lite Challenger Screen offers many advantages. It can be set up anywhere in 15 seconds. The Da-Lite Glass-Beaded fabric is mounted on a spring roller in a metal case, to which a tripod is permanently and pivotally attached. The Challenger is the only screen with square tubing to hold the case aligned—the only screen that can be adjusted in height by releasing a spring latch and raising the extension support. (No separate adjustment of case.) 12 sizes from 30″ x 40″ to 70″ x 94″ inclusive. From $12.50 * up.

DA-LITE PROJECTOR STAND

provides a convenient place for the projector at a sufficient height to permit projection of pictures above the heads of the audience. Choice of either a tilting table with side clamps (No. 1) for silent projectors or a non-tilting table (No. 2) for sound and slide projectors. Stand with table $18.00 *. Table alone (either style) $10.00*.

** Prices slightly higher on Pacific Coast.*

DA-LITE Scenic Roller Screen

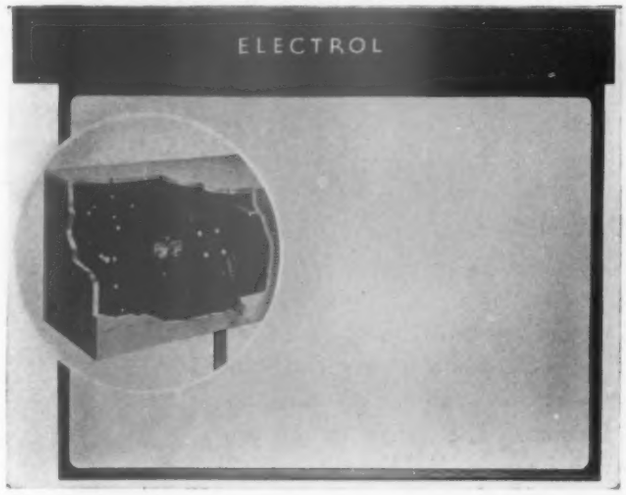
For permanent installations on auditorium stages which do not have high lofts, the Da-Lite Scenic Roller Mounting provides an economical solution to the screen problem. 12 sizes from 8′ x 10′ to 20′ x 20′. Prices on request.

DA-LITE SCREEN CO., INC.

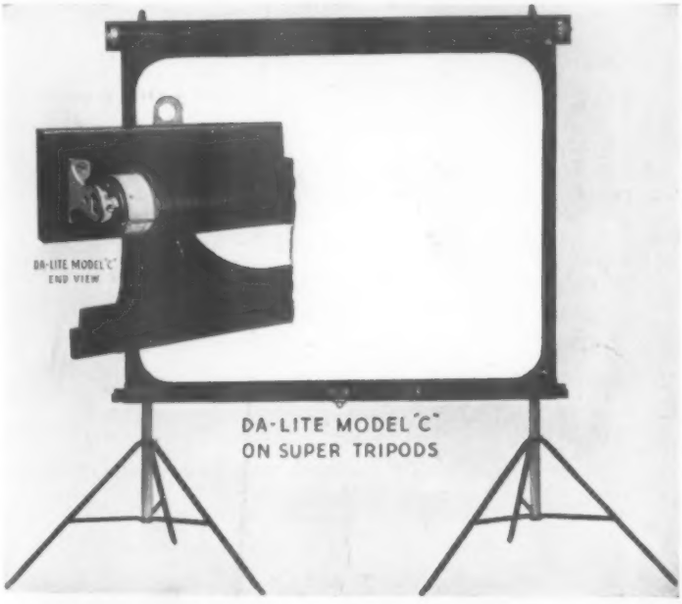
Manufacturers of Theatrical and Non-Theatrical Screens with All Types of Surfaces and Mountings

Dept. 40 A. S., 2723 NORTH CRAWFORD AVE., CHICAGO, ILLINOIS

DA-LITE ELECTROL
Electrically Operated



In large classrooms and auditoriums the Da-Lite Electrol Screen assures perfect projection with maximum convenience. It can be unrolled, stopped or raised by electrical control, placed anywhere desired. It stops automatically when completely unrolled or re-rolled. Speed of movement is constant so that there is no strain on the screen fabric and no danger of damaging its surface. The electric motor, gear drive and screen are housed in a sturdy case, which may be hung from the wall or ceiling or installed in recesses. 14 standard sizes ranging in width from 8′ to 20′ inclusive. Beaded surface is standard but a mat white surface can be supplied when specified, at the same price. Prices and complete details on request.



PARTIAL LIST OF USERS OF DA-LITE ELECTROL SCREENS

State University of Iowa, Iowa City, Iowa
Mellon Institute, Pittsburgh, Pa.
Studebaker Corporation, South Bend, Ind.
Freeport High School, Freeport, New York
Boys Central High School, Butte, Mont.
J. G. Ewing & Sons, 262 Lovers Lane, Baton Rouge, La.
Burnham High School, Sylvania, Ohio
George Washington High School, Danville, Va.
Collinsville Township High School, Collinsville, Ill.
Field Museum, James Simpson Memorial Theatre, Chicago, Ill.
Commercial High School, New Haven, Conn.
University of Utah, Salt Lake City, Utah
Dexter St. School, West Lynn Elementary, Lynn, Mass.
State Laboratory of Hygiene, Raleigh, N. C.

MODEL C - *Back Board Type*

For large lecture halls and auditoriums the Da-Lite Model C is a practical screen. It is made in 8 sizes from 6′ x 8′ to 12′ x 12′ inclusive. The spring roller is extra large and durably made. It is attached to a heavy back-board by strong brackets, as shown in the detailed view above. Brackets for hanging from wall, ceiling, or Da-Lite Super or DeLuxe Tripods are furnished. At slight extra cost the Model C screen can be furnished with a protective metal case. Beaded screen fabric is standard but mat white fabric will be supplied when specified, at the same prices. These screens, without the metal cases are priced from $46.00 * up.

MODEL B - *In Metal Case*

Showings to audiences of medium size can be made efficiently with the Model B Screen. The Da-Lite Glass-Beaded Screen fabric is spring roller mounted in a metal case which has a baked black crystal finish. White or Silver fabric can be supplied on request. 12 sizes from 22″ x 30″ to 63″ x 84″ inclusive. From $7.50 * up.

** Prices slightly higher on Pacific Coast.*

WESTERN ELECTRIC COMPANY

New York, N. Y.

Distributor in the United States
GRAYBAR ELECTRIC COMPANY
Graybar Building, New York, N. Y.
Distributor for Canada and Newfoundland
NORTHERN ELECTRIC COMPANY, LIMITED
1261 Shearer Street, Montreal, P. Q.

Western Electric
SOUND DISTRIBUTION SYSTEMS

General

Western Electric equipment picks up, amplifies and distributes speech or music to all parts of an auditorium—to any or all rooms in a building—or to a number of points out of doors. The source of the program may be (1) Microphones, (2) Record Reproducer, (3) Radio Receiver.

New equipment developed by Bell Telephone Laboratories for the Western Electric Company now provides for greater quality and flexibility of use than heretofore.

The 639 Type microphone is especially adaptable to school needs.

Many up-to-the-minute schools, colleges and universities in all parts of the country have found Western Electric sound distribution systems valuable—for both educational and administrative uses.

What goes into a Sound System?

There's much more to a good sound distribution system than just electrical equipment. The following six factors must all be balanced with expert care. (1) Sound Origin—whether speech, or music, or both, (2) Sound Pick-up, (3) Amplifiers, (4) Loud Speakers, (5) The Room or Rooms — size, shape, acoustics, etc., (6) The Audience — whether large or small.

Because these factors vary so widely in different installations, each Western Electric sound system is skillfully engineered to meet the specific needs in each case.

Workmanship, Service and Cost

Quality workmanship and performance are assured by the name Western Electric—manufacturer of telephones and other sound-transmission apparatus for the Bell System since 1877.

Stocks of spare parts, engineering advice and expert service are always available through distributors located at strategic points throughout the country.

Farrell High School, in Farrell, Pa., is one of many users of Western Electric Sound Distribution Systems. Note loudspeaker above blackboard.

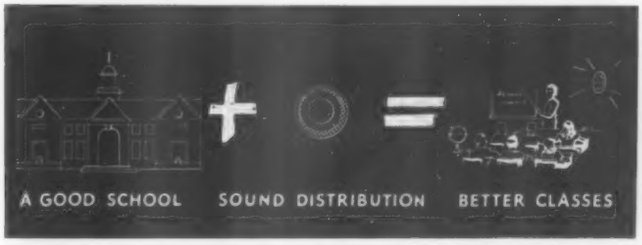
This attractive school at Millburn, New Jersey, is modern in every way. It has been Western Electric equipped for a number of years.

In estimating the cost of installation, specific requirements must be considered. Graybar Electric Company specialists—with years of experience in this work—will gladly survey your buildings, recommend a system for adequate coverage, furnish complete specifications and an estimate of cost.

Operating costs are surprisingly low—only a few cents an hour.

Uses in Schools

Sound distributing equipment is a valuable aid to teachers of languages, current events, music appreciation, home economics and other courses. It enables the principal to address all classrooms from his desk;



delivers fire drill instructions and emergency announcements instantly; supplies music or voice amplification in gymnasium or auditorium. Its usefulness extends throughout the school day.

For full information, write to the distributors listed at top of preceding page.

East Rockaway High School, on Long Island, finds many uses for its Western Electric equipment throughout the school day.

WESTERN ELECTRIC AUDIOMETERS

Poor hearing is often the cause of poor classwork. With the Western Electric 4C Audiometer, pupils' hearing acuity may be measured quickly and scientifically—as many as 40 at one time.

This scientific instrument consists of a turntable with magnetic reproducer—and from 10 to 40 headsets through which pupils listen. It plays records scientifically designed to show degree of hearing loss. Pupils write what they hear on data sheets. By checking these against a master sheet, even slight hearing defects are seen at a glance. Ask the distributors for booklet giving full details.

WESTERN ELECTRIC AUDIPHONES

For the hard-of-hearing, Western Electric offers the new Ortho-technic model Audiphone—built on

Air Conduction

Bone Conduction

entirely new principles in hearing aid design. Using either air conduction or bone conduction receivers, this new aid is assembled to meet individual needs.

There is also the Western Electric Group Audiphone. With this, the speaker's words are picked up by a microphone, amplified, and delivered through individual headsets. Further details from the distributors on the preceding page.

AUTOMATIC DEVICES COMPANY

1037 Linden Street, ALLENTOWN, PA.

EXPORT DEPARTMENT — 220 W. 42nd Street, NEW YORK, N. Y., U. S. A.

DIRECT FACTORY REPRESENTATIVES

CHICAGO, ILL., N. C. Nussbaumer, 842 N. Harvey Avenue, Oak Park, Ill. ST. LOUIS, MO., A. M. Pollack, 1310 Midland Drive

ALLENTOWN SILENT STEEL CURTAIN TRACK

"Splendid school buildings are being built in all parts of the country with auditoriums designed to be used for school dramatics, and almost universally they are totally unsuited for the purpose."
—Milton Smith in "The Equipment of the School Theatre"

ALLENTOWN autodrape CURTAIN MACHINE

The design of a school stage properly and adequately equipped for the school's music, art and drama activities requires not only the services of an architect thoroughly familiar with school building problems in general, but also the advice of an engineer who **specializes** in school stage design and equipment.

Do not fail to call in an Automatic Devices Company representative in the **early** stages of planning for any new school building. He will be glad to cooperate with the architect in working out stage essentials for the installation of noiseless, effortless and smooth curtain operation.

Allentown "Silent Steel" Curtain Track used in this installation will provide the proper operation of any size draw curtains at economical cost. The first curtain track on the market to use rubber wheels and ball bearings, the "Silent Steel" Track has proved its efficiency by years of service on large and small stages throughout the world.

Special features are the two wheels on each carrier instead of one, and the 100% ball-bearing equipment throughout. The Track is fully enclosed except for the bottom slot, and more than adequate in strength for any school requirement. It may be operated by either hand pull or automatic control.

TO DETERMINE GROSS LENGTH OF TRACK REQUIRED

As a basis, start with the clear width of opening which curtain is to uncover; i.e., distance between inside edges of curtain halves when in open position.

Add 10% for lap at center for curtain when closed.

Add 10% for extension on each end to accommodate each half of curtain when in open position.

Total addition is 30%

Example: Open curtain is to expose 30 ft. clear width. Add total of 30% or 9 ft. for center lap and both end extensions.
Specify 39 ft. gross length in two sections each 19 ft. 6 in.

Silent Steel Track Assembly

Silent Steel Balanced Ball-Bearing Curtain Carrier

SUGGESTED SPECIFICATIONS

Curtain Tracks shall be of steel construction, fully enclosed, except for slot in bottom, and free of any riveted or other mechanical joints regardless of length, except at center lap. Each curtain carrier shall be supported on ball bearings by two special composition rubber wheels rolling on two separate parallel treads and all pulley blocks equipped with steel, ball-bearing wheels adequately guarded; all as manufactured by **Automatic Devices Company** of Allentown, Pa.

Also available are "Besteel" Medium Duty and "Steelite" Light Duty Steel Curtain Tracks.

It has never been desirable, and it is no longer necessary, to depend upon human hands to pull stage curtains at precisely the right time and at exactly the same speed. Allentown Automatic Curtain Machines have been developed over a period of more than eighteen years to accomplish the smoothest and most reliable operation in the simplest possible manner, by push-button control from any number of points desired.

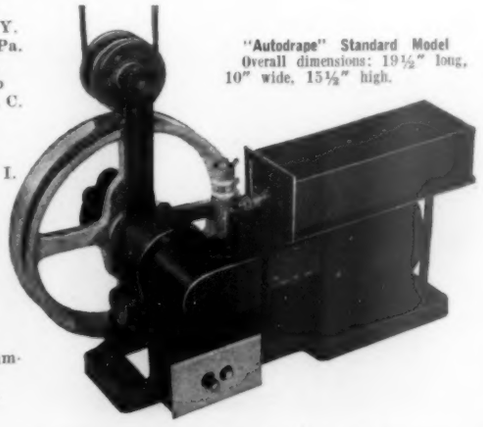
The Standard Model of Autodrape Machine is equipped with every accessory to assure continuous dependable operation, including elevator type traction drive, automatic overload protective breaker, positive disconnecting clutch, ball-bearing idler assembly and many other desirable features obtainable only in Allentown equipment. Special features include:

(1) Limit Switch Arrangement — Adjustment for "open" and "close" positions reduced to simplest form.
(2) Elevator Type Traction Drive — Maximum delivered power without slippage.
(3) Mounting — Endless cable design allows installation of machine at any position in vertical plane of track.
(4) Disconnecting Clutch—For conversion to hand operation.
(5) Automatic Overload Protective Breaker — Protects machine against excessive loads.
(6) Motor—¼ or ⅓ hp., single phase.
(7) Speed—92 or 115 ft. per minute, equivalent to curtain separation of 2¾ or 3½ ft. per second, respectively (based on 60-cycle current).

Also available are Special and Heavy-Duty Models, to meet the requirements of all types of school stages, from the smallest to the largest.

Representative Installations

Public Schools
New York, N. Y.
Philadelphia, Pa.
Baltimore, Md.
Cleveland, Ohio
Washington, D. C.
Newark, N. J.
Buffalo, N. Y.
Seattle, Wash.
Providence, R. I.
Colleges
University of Chicago
U. S. Military Academy
Swarthmore
University of Maine
University of British Columbia
New York University



"Autodrape" Standard Model
Overall dimensions: 19½" long, 10" wide, 15½" high.

TRACK SAMPLES SUPPLIED WITHOUT COST OR OBLIGATION

CAPITOL STAGE LIGHTING COMPANY

E. ALTMAN, Proprietor

527–529 West 45th Street, New York, N. Y.

Cable Address: CAPCOLITE, New York

Distributed Abroad by

ELECTRICAL RESEARCH PRODUCTS, INC.

Subsidiary of

WESTERN ELECTRIC COMPANY, INC.

SPOTLIGHTS

No. 6Y

No. 8Y

No. 12

No. 19S

The Capitol Incandescent spotlights are now manufactured and available in a complete line from the smallest to the largest type, equipped with short table bases, pipe clamp hangers, telescoping stands or wall type brackets.

These spotlights can be operated on either Alternating or Direct current, 110 or 220 volts, without flicker, noise or carbons by the use of the latest type concentrated filament lamps manufactured.

All Capitol incandescent type spotlights from 500 to 2000 watts are equipped with a mogul screw base receptacle and are interchangeable with prefocus type sockets at slight additional cost. The socket holders are so made that the sockets can be raised, lowered or swiveled to permit the proper centering of the lamp for most efficient operation.

The Capitol spotlights are assembled by skilled mechanics and constructed of the best polished iron obtainable with front and rear aluminum castings, extra long focusing devices and self-closing doors on most models.

Our Engineering Department will be glad to make recommendations for the best spotlights to meet your requirements upon receipt of full information, and we trust that you will not hesitate to avail yourself of this service.

On this and following pages you will see illustrated the various types carried in stock. The United States Government has purchased over a thousand of these different styles for their Federal Theatre Projects throughout the country and Capitol equipment has been shipped to Japan, China, Australia, Greece, Philippine Islands, Cuba, South America, etc.

No. 6Y.	Baby spotlight, equipped with yoke and pipe clamp for overhead lighting. Weight 8½ lbs.	Price $12.00
No. 8Y.	400 watt baby spotlight, equipped with pipe clamp hanger. Weight 12 lbs.	Price $18.00
No. 12.	500-1000 watt spotlight equipped with pipe clamp, 6 inch lens and asbestos lead wires. Weight 15 lbs.	Price $20.00
No. 19S.	1000-2000 watt spotlight on stand with round base, asbestos lead wires, full connector, 25 foot of approved stage cable and 6 inch lens. Weight 49 lbs.	Price $48.00

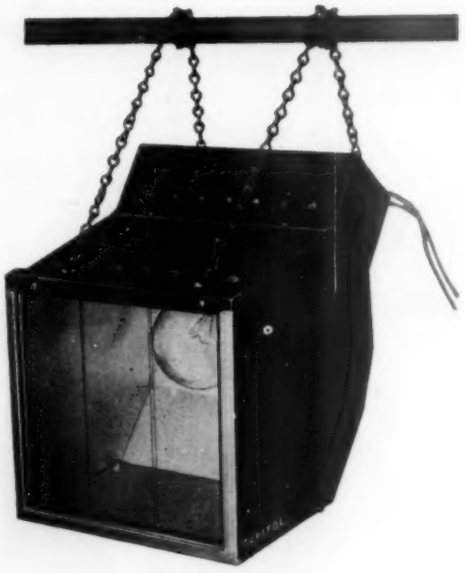
Lamps Not Included in Above Prices

YES WE HAVE A COMPLETE CATALOG. YOURS UPON REQUEST

No. 32

HANGING FLOODLIGHTS

The Capitol floodlights have an intense illuminating efficiency and are used in many theatres instead of borderlights for a more flexible control of light. Ventilation in these units has been amply provided for. Special types or units can be made to order.



No. 29

SPECIFICATIONS

No. 29. The Capitol 500/1000 watt floodlight illustrated above is constructed of extra heavy galvanized sheet iron; mogul screw base receptacle, asbestos lead wires and chains for hanging to which are attached snap hooks. The reflecting surface is sprayed with our special aluminum heat resisting paint, outside sprayed ebony. Grooves provided for colorframes. Weight 12 lbs. ..... **Price $10.50**

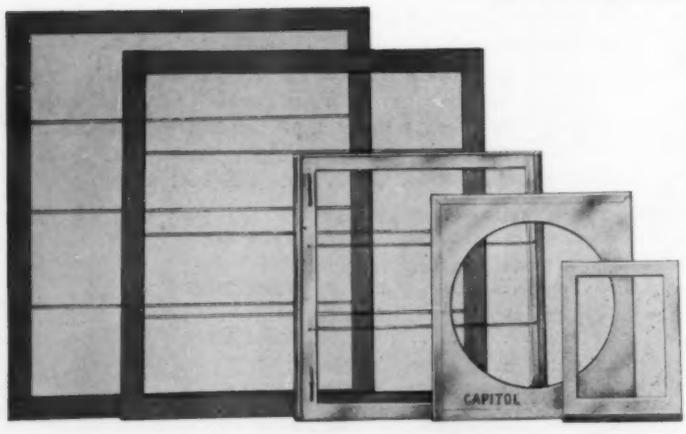
No. 30. This type floodlight is identical with our catalog number 29 floodlight with the exception that chains are replaced with our number 198 pipe clamp. Weight 13 lbs. ..... **Price $12.00**

No. 31. The Capitol 1000 watt suspension type floodlight is somewhat larger than our No. 29 floodlight, having an 18 x 18 inch opening accommodating our regular wood colorframe number 306. This floodlight is constructed of extra heavy galvanized sheet iron, equipped with a mogul screw base receptacle, asbestos lead wires and chains for hanging to which are attached snap hooks. The reflecting surface is sprayed with our special aluminum heat resisting paint, outside sprayed ebony. Weight 15 lbs. ..... **Price $12.00**

No. 32. This floodlight, illustrated above, is identical with our catalogue number 31 with the exception that the chains are replaced with our catalog number 198 pipe clamp. Weight 16 lbs. ..... **Price $13.50**

Lamps Not Included in Above Prices

COLORFRAMES



	Description	
No. 298.	Metal colorframe size 5 x 5 inches	Price $ .25
No. 299.	Metal colorframe size 5½ x 5½ inches	Price $ .25
No. 300.	Metal colorframe size 5¾ x 7½ inches	Price $ .40
No. 301.	Metal colorframe size 8 x 9 inches	Price $ .30
No. 303.	Metal colorframe size 12 x 13 inches	Price $1.25
No. 304.	Metal colorframe size 18 x 18 inches	Price $2.00
No. 305.	Metal colorframe size 18 x 20 inches	Price $2.00
No. 328.	Metal colorframe round 16 inch diameter	Price $2.00
No. 302.	Metal colorframe size 10 x 11 inches	Price $ .60
No. 306.	Wood colorframe size 18 x 18 inches	Price $ .60
No. 307.	Wood colorframe size 18 x 20 inches	Price $ .60

No. 308. Metal colorframe to hold two gelatines, size 8 inches by 15 inches long ..... **Price $ .75**

No. 309. Metal colorframe to hold three gelatines, size 8 inches by 21 inches long ..... **Price $1.25**

OLIVETTES

SPECIFICATIONS

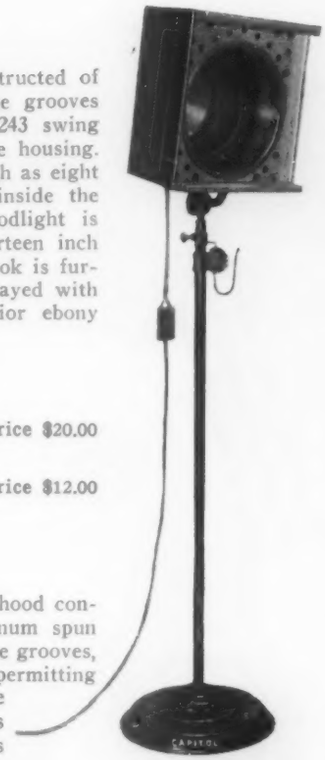
No. 1

No. 1. 1000 watt olivette on telescoping stand, constructed of heavy sheet iron and equipped with double colorframe grooves and a No. 234 gooseneck bracket inserted in a No. 243 swing joint permitting a complete universal adjustment of the housing. The stand is four feet in height but may be raised as high as eight feet through adjustment of a pipe which telescopes inside the stand and is furnished with the floodlight. The floodlight is equipped with a mogul screw base receptacle. A fourteen inch iron base is attached to the pipe and a No. 238 cable hook is furnished to hold the cable. The reflecting surface is sprayed with our special aluminum heat resisting paint and exterior ebony finish.

No. 1. Olivette complete with stand, 25 ft. approved stage cable and full 15 ampere connector. Weight 43 lbs. ..... **Price $20.00**

No. 1H. Hood only with gooseneck bracket. Weight 15 lbs. ..... **Price $12.00**

SPECIFICATIONS



No. 2R

No. 2R. 1000/1500 watt olivette on telescoping stand, hood constructed of heavy sheet iron and equipped with aluminum spun oakite finish reflector of high efficiency. Double colorframe grooves, gooseneck bracket inserted in a No. 243 swing joint permitting a complete universal adjustment of the housing. The stand is four feet in height but may be raised as high as eight feet through adjustment of a pipe which telescopes inside the stand and is furnished with the olivette. An eighteen inch iron base is attached to the pipe and a No. 238 cable hook is furnished to hold the cable. A mogul screw base receptacle is furnished. Outside of floodlight is sprayed ebony.

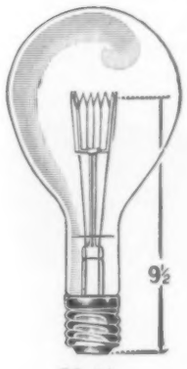
No. 2R. Olivette complete with stand, 25 ft. of approved stage cable and full 15 ampere connector. Weight 61 lbs. ..... **Price $30.00**

No. 2RH. Hood only with reflector and gooseneck bracket. Weight 23 lbs.. **Price $20.00**

Lamps Not Included in Above Prices

LAMPS

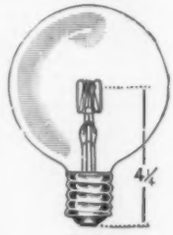
CONCENTRATED FILAMENT TYPES FOR SPOTLIGHTS



PS 52
1000 W.

Catalog No.	Wattage	Style of Bulb	Style of Base	Voltage	Light Center	Price
700	100	P 25	Medium screw	115	2½"	$ .85
702	250	G 30	Medium screw	115	3 "	1.40
704	400	G 30	Medium screw	115	3 "	2.25
706	500	T 20	Medium screw	115	3 "	2.40
708	500	T 20	Medium prefocus	115	3 "	2.40
710	500	G 40	Mogul screw	115	4¼"	3.00
712	1000	T 20	Mogul screw	115	4¼"	5.25
714	1000	G 40	Mogul screw	115	4¼"	5.75
716	1000	G 40	Mogul screw	115	5¼"	5.75
718	1000	G 40	Mogul prefocus	115	3 15/16"	6.15
720	1500	G 40	Mogul screw	115	5¼"	8.25
722	1500	G 40	Mogul prefocus	115	3 15/16"	8.65
724	2000	G 48	Mogul screw	115	5¼"	13.00
725	2000	G 48	Mogul prefocus	115	3 15/16"	13.40
726	5000	G 64	Mogul Bipost	115	6½"	23.00
728	5000	G 96	Mogul Bipost	115	10 "	65.00

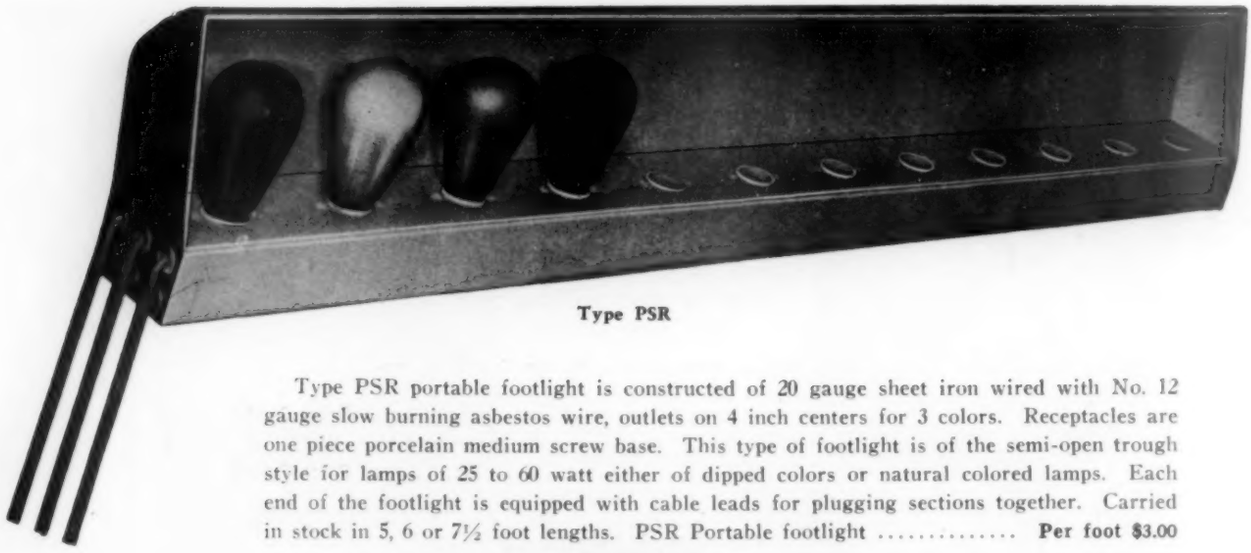
G 30
400 W.



G 40
1000 W.

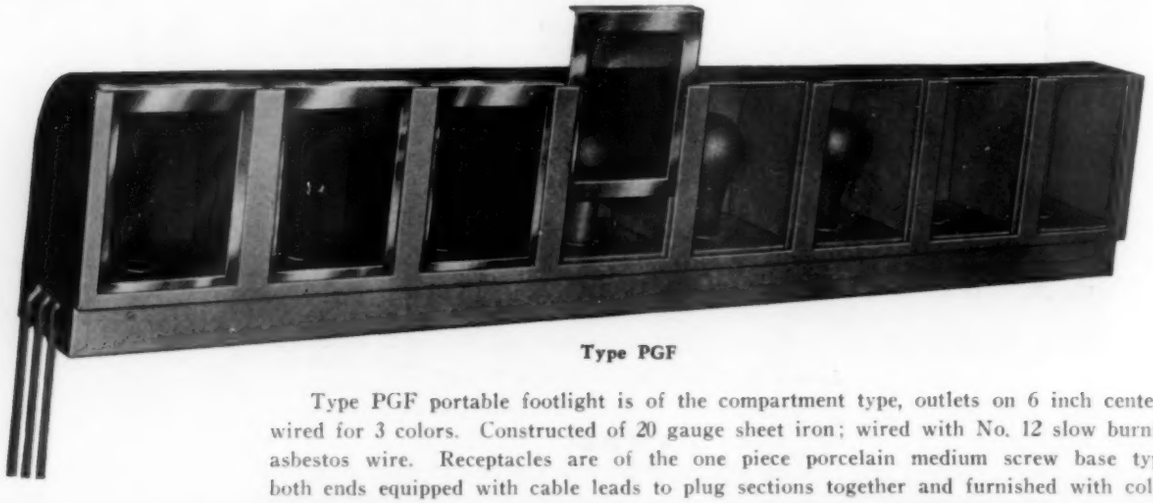
HAVE YOU A COPY OF OUR LATEST CATALOG?

PORTABLE FOOTLIGHTS



Type PSR

Type PSR portable footlight is constructed of 20 gauge sheet iron wired with No. 12 gauge slow burning asbestos wire, outlets on 4 inch centers for 3 colors. Receptacles are one piece porcelain medium screw base. This type of footlight is of the semi-open trough style for lamps of 25 to 60 watt either of dipped colors or natural colored lamps. Each end of the footlight is equipped with cable leads for plugging sections together. Carried in stock in 5, 6 or 7½ foot lengths. PSR Portable footlight ..... **Per foot $3.00**



Type PGF

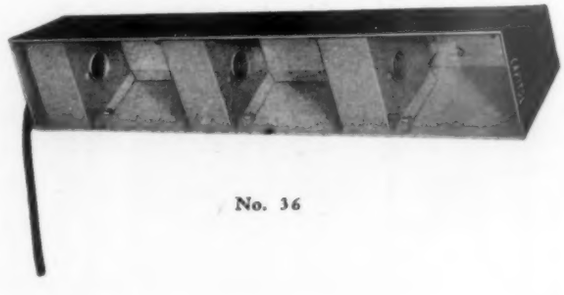
Type PGF portable footlight is of the compartment type, outlets on 6 inch centers; wired for 3 colors. Constructed of 20 gauge sheet iron; wired with No. 12 slow burning asbestos wire. Receptacles are of the one piece porcelain medium screw base type; both ends equipped with cable leads to plug sections together and furnished with color-frames. Carried in stock in 6 and 7½ foot sections. PGF Compartment portable footlight ..... **Per foot $4.00**

All reflecting surfaces painted with our special white paint; outside in ebony.

STRIPLIGHTS

Capitol striplights illustrated in figure No. 36 are all constructed of 20 gauge sheet iron. Receptacles are of one piece porcelain, medium screw base type, wired for one circuit with No. 12 slow burning asbestos wire, and furnished with cable lead. Each striplight is fully enclosed on three sides and provided with hook for hanging. Reflecting surface painted with our special white paint.

No. 35— 2 light striplight—outlets on 8 inch center	$ 3.00
No. 36— 3 light striplight—outlets on 8 inch center	4.00
No. 37— 4 light striplight—outlets on 8 inch center	5.00
No. 38— 6 light striplight—outlets on 8 inch center	7.00
No. 39— 8 light striplight—outlets on 8 inch center	9.00
No. 40—10 light striplight—outlets on 8 inch center	11.00



No. 36

Lamps Not Included in Above Prices

IRIS SHUTTERS

No. 61

The Capitol iris shutters can be used on all standard spotlights. They are also being used in moving picture theatres for port hole openings.

The entire frame is constructed of cast aluminum, with brass leaves and handles, the ends of which are inserted in fibre to eliminate the burning of fingers.

The handles are 4 inches long, one on each side of the shutter to permit operation from either side of the lamp.

The Capitol iris shutters do not interfere with the operation of colorframes or colorwheels, both of which can be used at the same time. Irises are manufactured in various sizes.

No. 61. 6 inch iris shutter double handle. Weight 2½ lbs. ..... Price $12.00

STAGE CABLES

Size of cable B & S Gauge		Carrying capacity in amperes	Price per 100 feet
No. 18	2 conductor stage cable	3	$ 3.50
16	2 conductor stage cable	6	5.00
14	2 conductor stage cable	15	7.50
12	2 conductor stage cable	20	10.00
10	2 conductor stage cable	25	13.75
8	2 conductor stage cable	35	19.50
6	2 conductor stage cable	50	30.00
4	2 conductor stage cable	70	38.00
2	2 conductor stage cable	90	55.00
0	2 conductor stage cable	125	78.80
00	2 conductor stage cable	150	105.00

ASBESTOS FLEXIBLE WIRE

Size of cable B & S Gauge		Carrying capacity in amperes	Price per 100 feet
No. 14	Extra flexible asbestos wire	20	$ 8.00
12	Extra flexible asbestos wire	25	10.00
10	Extra flexible asbestos wire	30	12.00
8	Extra flexible asbestos wire	50	15.00
6	Extra flexible asbestos wire	70	22.00
4	Extra flexible asbestos wire	90	30.00
2	Extra flexible asbestos wire	125	40.00

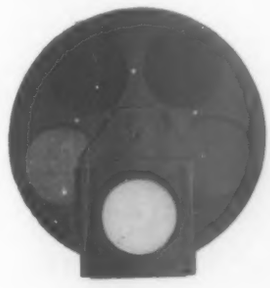
HUNDREDS OF OTHER ITEMS LISTED IN OUR COMPLETE CATALOG

THE AMERICAN SCHOOL AND UNIVERSITY—1940

PLANO CONVEX LENSES

Diameter	Focus	Price
3½ in.	6 in.	$ .95
3½ in.	8 in.	.95
3½ in.	10 in.	.95
3½ in.	12 in.	.95
4½ in.	6½ in.	1.10
4½ in.	7½ in.	1.10
4½ in.	9 in.	1.10
5 in.	7½ in.	1.80
5 in.	9 in.	1.80
6 in.	9 in.	2.50
6 in.	10 in.	2.50
6 in.	12 in.	2.50
6 in.	18 in.	2.50
8 in.	12 in.	6.00
8 in.	14 in.	6.00
8 in.	18 in.	6.00

These Plano Convex lenses are used in spotlights, scioptikons, condensing lens holders or wherever a lens of the finest quality is used.



No. 75 5 hole colorwheel for all standard spotlights using 8 x 9 colorframes, 18 inch dia. wheel. Weight 2½ lbs. Price $5.50

No. 76 6 hole colorwheel for all standard spotlights using 8 x 9 colorframes, 19 inch dia. wheel. Weight 3 lbs. Price $6.50

LAMP COLORING

The Capitol transparent lamp coloring is a specially prepared solution for the coloring of incandescent lamps and globes. The process is simple and instantaneous. Dipping the lamp into the solution while the current is turned on and immediately withdrawing it, produces a brilliant and durable transparency that will not crack, peel or chip off, giving the lamp the appearance of being made of natural glass.

"Capco," which is our trade mark for your protection, is carried in stock in the following colors in pints and quarts; quart can is furnished with dipping cup. One quart will color approximately 400 60-watt lamps. We also carry frosted colors.

RED	FROST	PURPLE
AMBER	STRAW	MOONLIGHT BLUE
PINK	GREEN	DARK BLUE

Pint bottle	$1.50
Quart bottle with dipping cup	2.80
Lamp coloring remover per pound	.50
Thinner per quart	2.00

GELATINE COLOR MEDIUMS

G 1	Frost	G25	Daylite blue	G49	Dark green
G 2	Light flesh pink	G26	Light sky blue	G50	Light lemon
G 3	Flesh pink	G27	Light blue	G51	Medium lemon
G 4	Medium pink	G28	Light navy blue	G52	Dark lemon
G 5	Pink	G29	Special steel blue	G53	Very light straw
G 6	Rose pink	G30	Light blue special	G54	Light straw
G 7	Dark rose pink	G31	Medium sky blue	G55	Medium straw
G 8	Deep pink	G32	Medium blue special	G56	Dark straw
G 9	Dubarry pink	G33	Medium blue	G57	Light amber
G10	Light magenta	G34	Medium navy blue	G58	Medium amber
G11	Medium magenta	G35	Dark sky blue	G59	Amber
G12	Dark magenta	G36	Non-fade blue	G60	Dark amber
G13	Rose	G37	Dark blue	G61	Orange
G14	Rose purple	G38	Dark navy blue	G62	Light scarlet
G15	Dark rose purple	G39	Urban blue	G63	Special light red
G16	Violet	G40	Light green blue	G64	Light red
G17	Special lavender	G41	Moonlight blue	G65	Medium scarlet
G18	Medium lavender	G42	Nile blue	G66	Pink red
G19	Dark lavender	G43	Light blue green	G67	Fire red
G20	Light purple	G44	Medium blue green	G68	Dark red
G21	Purple	G45	Blue green	G69	Special chocolate
G22	Royal purple	G46	Dark blue green	G70	Chocolate
G23	Medium purple	G47	Light green	G75	Grey
G24	Dark purple	G48	Medium green		

	All colors gelatine listed above from No. 1 to 75 are plain colors; sizes of sheets 20 x 24 inches	per sheet	$ .14
G 80	Yellow and green variegated gelatine	per sheet	.50
G 85	Pink and green variegated gelatine	per sheet	.50
G 90	Purple and green variegated gelatine	per sheet	.50
G 95	Red, yellow and blue variegated gelatine	per sheet	.50
G100	Rainbow gelatine	per sheet	.50
No. 99	Square metal gelatine box		4.00

When remitting for gelatine do not fail to include postage.

Packing weight of —	10 sheets	25 sheets	50 sheets	100 sheets
	1 lb.	3 lbs.	6 lbs.	10 lbs.

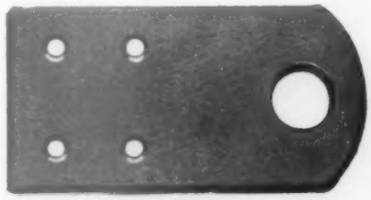
Descriptive booklet containing sample gelatine sheets in the above colors mailed upon receipt of ten cents.

EXTENSION STAGE BRACES

Our Extension Stage Braces are made of thoroughly seasoned and selected wood finished in hard oil with iron work neatly japanned.

Cat. No.		Length Closed	Length Extended	Price, Ea.
600	Stage Brace	2 ft.	2 ft. 7 in.	$2.75
601	Stage Brace	3 ft.	4 ft. 7 in.	2.75
602	Stage Brace	4 ft.	6 ft. 4 in.	2.75
603	Stage Brace	5 ft.	8 ft. 4 in.	2.75
604	Stage Brace	6 ft.	10 ft. 4 in.	2.75
605	Stage Brace	8 ft.	14 ft. 4 in.	3.00
606	Stage Brace	10 ft.	18 ft. 4 in.	3.00
607	Stage Brace	12 ft.	22 ft. 4 in.	3.75
608	Stage Brace	16 ft.	30 ft. 4 in.	4.00

No. 621

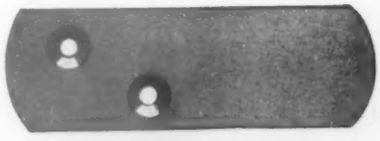


No. 615

No. 612

No. 616

No. 613



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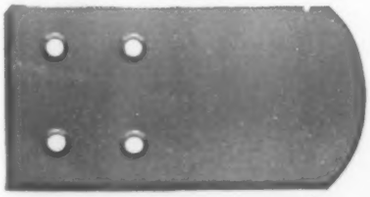


No. 614

No. 618

No.	Description	Price
621	Malleable iron stage screw Per dozen	$3.20
612	Wrought steel lash cleat each	.06
613	Improved lash cleat...each	.07
614	Wrought steel flat cleat each	.06
615	Wrought steel brace cleat each	.07
616	Wrought steel tie-off cleat each	.04
617	Wrought steel stop cleat each	.04
618	Wrought steel round lash cleat .....each	.04

Our Complete Catalog No. 19 is Now Ready. Illustrates Your Complete Requirements

SEND FOR YOUR COPY — IT'S FREE

DIMMERETTE SWITCHBOARD

Single Vitrohm Dimmerette Switchboard Unit

This compact, totally enclosed switchboard is a complete light control for the non-professional stage where circuits of 1650 watts or less are generally used. It consists of an assembly of Switchboard Units with or without Switch Units and Master Switch Units.

The Dimmerette Switchboard is of unit type construction; that is, the installation may be started with one unit and additional units added as funds permit. A screw driver is the only tool needed for this addition. The units are bolted together and inter-connected by means of three copper bus bars furnished with each unit.

The Switchboard unit consists of a Vitrohm non-interlocking dimmer plate of special design, two 15 ampere toggle switches, two plug fuses and a 15 ampere pin connector block for two circuits. The dimmer plate suited for the load should be selected from the table of dimmer ratings.

Although the dimmer is of the non-interlocking type, it is possible to control three with each hand due to the special spade handle.

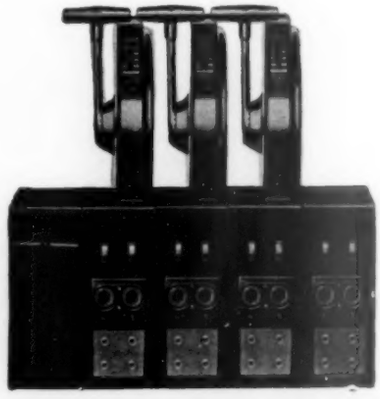
The Switch Unit is used when undimmed circuits are to be controlled. A dimmer plate may be added at any time.

The Master Switch Unit may be used as a master for any number of Switchboard Units up to the 60 ampere capacity of its two pole switch.

A typical Dimmerette Switchboard consisting of three Switchboard Units, a Switch Unit and a Master Switch Unit is shown in Fig. DS

DIMMER RATING

Watt range	Catalog No.
250- 400	42504
400- 550	42505
550- 750	42506
750-1000	42507
1000-1350	42508
1350-1650	42509



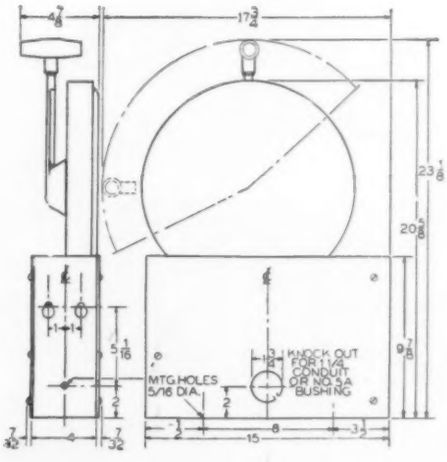
No. DS
A Bank of Three Units—
Master and Switch Units

DIMMERETTE LIST PRICES

Description	List Price	Shipping Weight
Switchboard unit with dimmer	$40.00	35 lbs.
Switch unit	17.00	23 lbs.
Dimmer	23.00	18 lbs.
Master switch unit	22.00	25 lbs.

Master Switch Unit

Switch Unit



J. R. CLANCY, INC.

DESIGNERS AND BUILDERS OF STAGE MECHANICAL EQUIPMENT

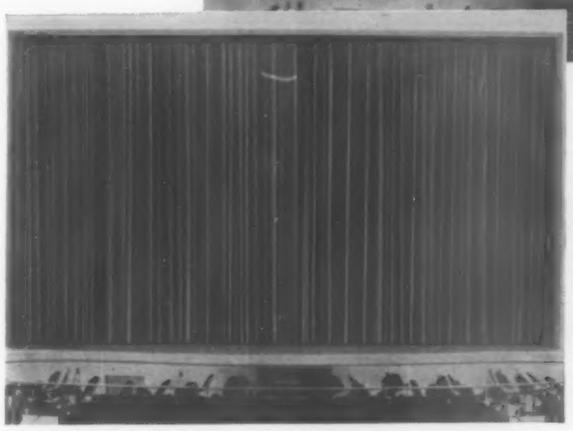
EST. 1885 . . . . Syracuse, N. Y.

•

The mechanical equipment of the stage is the business of specialists—engineers and designers who think always of the intricacies of the theater, the requirements of safety, the elements of economy, and the beauties of theatrical design.

Since 1885—the name "Clancy" has represented quality materials, design, construction and service, in keeping with the best traditions of the stage. That experience and facility is available to school authorities contemplating building or remodeling assembly halls, auditoriums or theaters.

Complete plans for everything that has to do with the mechanical operation of the stage, together with specifications covering all necessary material with estimated costs, are drawn to meet the particular needs of each installation. Counsel service on structural details is likewise available to architects and builders.



CLANCY CONTOUR CURTAINS *

Made in two types for variations in openings and diversified formations such as are featured in the Radio City Music Hall in New York, as well as for the formation of an attractive presentation or screen opening. It also takes the place of the permanent proscenium valence. Picture above shows this contour curtain raised; at left, same curtain closed.

* Manufactured under the original "Weidhaas Patents."

•

800 ITEMS . . .

"Clancy" makes more than 800 items of stage hardware and equipment—from tiny lash cleats to console and orchestra lifts, revolving stages and the new and magnificent "Clancy Contour Curtains" with all the necessary machinery for their clock-like and silent operation.

Clancy Products

Asbestos Curtains
Console Lifts
Contour Curtains
Counterweight Systems
Electric Curtain Contro's
Light Bridges
Orchestra Lifts
Paint Frames
Picture Sheet Frames
Rope and Cable
Revolving Stages
Sound Horn Trucks
Stage Hardware
Traveler Tracks
Wagon Stages

PLANNING QUESTIONNAIRE FREE . . .

If you have an immediate problem, send for a specially prepared questionnaire, your answers to which will enable us to give you much information of importance. This is a free service we are pleased to render.

No matter what your stage problem may be—in a new or old auditorium—the "Clancy" engineering and service organization can help you.

Write for Complete Catalog

CLANCY UTILITY TRACKS . . .

One of the many feature items of special interest in school work is this new and inexpensive all steel track, ample for horizontal draw curtains serving up to medium size proscenium openings. Fitted with ball bearing end pulleys, and double roller ball bearing carriers, this easy and silent operating track is priced within every school budget.

Originators and Manufacturers of "KLIEGLIGHTS"

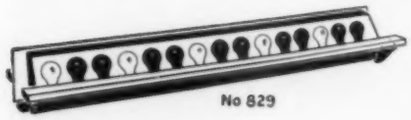
KLIEGL BROS.

UNIVERSAL ELECTRIC STAGE LIGHTING CO., INC.

321 West 50th Street
New York, N. Y.
COlumbus 5-0130

ARCHITECTURAL · COMMERCIAL *Lighting* THEATRICAL · DECORATIVE

EST. 1896


No 829

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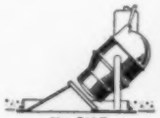
FOOTLIGHTS *and* BORDERLIGHTS: suitable designs for every requirement. Disappearing and permanent type footlights; with continuous open trough reflectors, or with individual reflectors and glass color roundels; colors as specified. Borderlights in corresponding designs.

No22 F12

No. 2164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No 43N3

No 43N6

No 70

No 1163

No 1165 BAC

No 540

No 546

No 1155

No 734

No 1741

No 739-4

No 1753

No 11

No 6N 14

No 43 N 16

No 1168 CR

No 2N

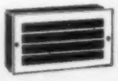
No 1602

No 766

No 311

No 697

No 711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AUDITORIUM LIGHTS: lighting fixtures for general illumination. Fresnel lens type inbuilt ceiling fixtures; concealed controlled-beam downlights; indirect cove strip lights with or without reflectors; step lights; exit signs; and other lighting equipment.

SPOTLIGHTS *and* FLOODLIGHTS: of every description for stage lighting and other applications. Arc and incandescent spots; plano-convex and Fresnel lens units; fully equipped with controls. Floodlights for indoor or outdoor use; various designs and sizes.

PLUGGING DEVICES, SUPPLIES: complete stock of lighting accompaniments; stage floor and wall pockets; pin plug connectors; dimmers; color lighting accessories; spotlight attachments; scenic effects, lamps, carbons, cables and other necessities.

PARTIAL LIST OF KLIEGL LIGHTING SPECIALTIES

Aisle Lights
Arc Spotlights
Auxiliary Switchboards
Balcony Spots
Borderlights
Bridge Spots
Cable, Stage & Borderlight
Carbons, for Arc Lamps
Chemical Smoke Effects
Cloud Machines
Color Boxes (Boomerangs)
Color-Changing Spotlights
Color Frames, Metal or Wood
Color Mediums, Gelatine or Glass
Colormatic Dimmers
Condensing Lenses
Connectors, Pin Plug
Corridor Lights
Cove Lights
Cyclorama Floodlights
Dimmer Banks, Interlocking
Dimmer Boxes, Portable
Directional Signs, Illuminated
Disappearing Footlights
Downlights
Effects, Scenic & Stage
Exit Signs
Fixtures, Lighting
Floodlights, Indoor, Outdoor
Fluorescent Light Fixtures
Flush Ceiling Fixtures
Footlights & Borderlights
Framing Shutters & Blinders
Front Lights
Gelatine Color Mediums
Gymnasium Lights
Heat-Resisting-Glass Lenses
Incandescent Spotlights
Iris Shutters & Dissolvers
Klieglights
Lamp Coloring Solutions
Light Projectors & Reflectors
Light Towers, Equipped
Lightning Strikers & Shutters
Linnebach Scene Projectors
Music Stands & Light Fixtures
Open-Box Floodlights
Outdoor Floodlights
Panel Pockets & Plugs
Pin-Plug Connectors
Playground Lights
Plugging Boxes, Portable
Pockets, Stage Floor & Wall
Portable Dimmer Boards
Portable Footlights
Poster Lights
Proscenium Lights
Recessed Light Fixtures
Remote Control Spotlights
Resistances & Rheostats
Scenic & Stage Effects
Spotlights, Arc & Incandescent
Spot Borderlights
Stage Lamps
Step & Aisle Lights
Stereopticons
Strip Lights
Swimming Pool Lights
Tower Lights, Spot & Flood
Transtat Dimmers
Wall Pockets & Plugs
Work Lights & Cleaner Stands

Architects, School Superintendents, Dramatic Instructors, and others interested in lighting —are invited to confer with our engineers in reference to their lighting plans and problems. Every assistance will be given to procure desired and satisfactory results.

WRITE FOR CATALOG OR INFORMATION ON ANY OR ALL KLIEGL LIGHTING DEVICES

I. WEISS AND SONS, INC.

445 West 45th Street, New York City

ESTABLISHED IN 1900

From ALL THE CHILDREN—37th Annual Report of the Superintendent of Schools, City of New York
Brooklyn Technical High School Stage-Curtains and Drapes made and hung by I. WEISS and SONS, INC.

Specialists in stage equipment for thirty-eight years!

STAGE CURTAINS • ASBESTOS CURTAINS • WINDOW CURTAINS • CURTAIN MOTOR
CYCLORAMA SETTINGS • WINDOW TRACKS • CURTAIN TRACK • PICTURE SCREEN
SCENERY • STAGE PROPERTIES • FLOOR CLOTH • LOCKING RAILS • STAGE RIGGING
STAGE HARDWARE • DECORATIVE ROPING • FLOOD LIGHTS • LIGHTING EFFECTS
FOOTLIGHTS • BORDER LIGHTS • CURTAIN CONTROLS • SPOT LIGHTS • OLIVETTES

FOR FURTHER INFORMATION AND NEW ILLUSTRATED CATALOGUE · WRITE DIRECT

THE BASSICK COMPANY

Bridgeport, Conn.

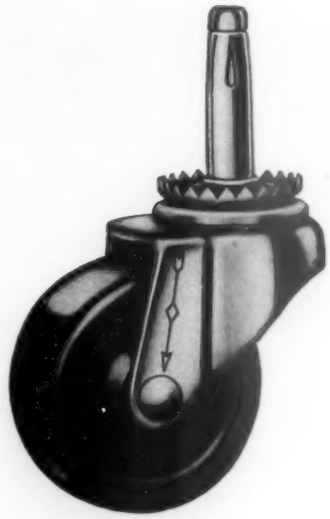
Bassick

OFFICE CHAIR CASTERS

"DIAMOND ARROW"—BALL BEARING

The Diamond Arrow casters are the highest quality casters for office chair use. They are ideally suited for hundreds of other uses where maximum ease of swiveling is desirable. New patented ball bearing construction gives "Full Floating" action, that provides easier swiveling, lower overall height and greater strength. Available with either "Baco" soft rubber tread or "Atlasite" solid tread composition wheels. All wheels have self-lubricating bearings. Bolt and nut axles are standard.

"Baco" soft rubber tread wheel casters are for use on linoleum, tile, cement or hard wood floors. "Atlasite" solid tread wheel casters are for use on rugs or carpets. Available with 1⅝" or 2" diameter wheels.



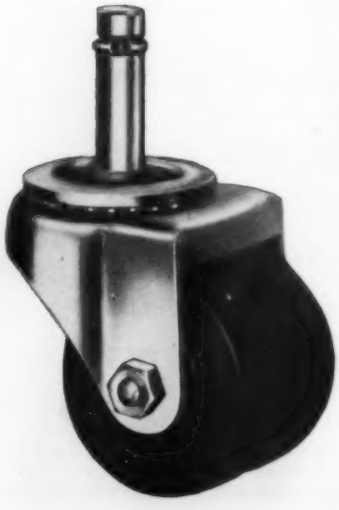
Size	Wheel Diam.	Tread Width	Baco Wheel	Atlasite Wheel	Weight Per Set—Oz.
7	1⅝"	¾"	7696	7699	18
9	2"	⅞"	9696	9699	23

DOUBLE WHEEL "DIAMOND ARROW" PIANO CASTER BALL-BEARING

This is an ideal caster for pianos, particularly in schools and institutions where floor protection is to be considered. They are also suited for many other types of heavy furniture.

Casters have the famous "Diamond-Arrow" two level ball bearing construction with chrome steel balls operating on hardened steel raceways, giving the lowest overall height possible on ball bearing casters. Oxidized copper finish.

No. 66 Socket



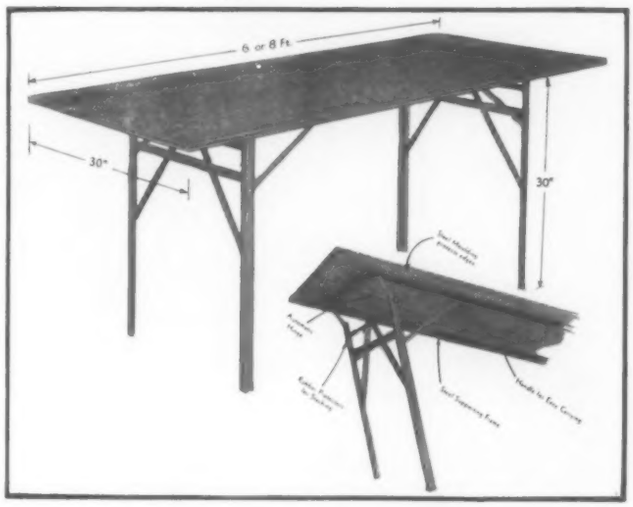
These double wheel casters when used with No. 66 sockets are an ideal combination for use on pianos which are frequently moved. Socket requires 9/16" bore, 1½" deep. Bottom plate is 2⅛" in diameter with four screw holes.

Numbers	Type Wheel	Wheel Diam.	Wheel Width	Overall Height	Weight Per Set—Lbs.
9006X2	"Baco"	2"	1⅝"	2⅝"	3½
9009X2	"Atlasite"	2"	1⅝"	2⅝"	3½
No. 66 Socket					⅝

THE BREWER-TITCHENER CORPORATION

118 Port Watson St.
Cortland, New York

Hostess FOLDING PRODUCTS



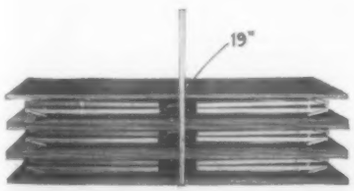
FOLDING BANQUET TABLES

The construction feature of an all-steel frame (Note illustration) gives exceptional lightness with superior strength and rigidity. Frame and legs are of 1 x 1 x 7/64" high carbon angle steel. The legs are spray-lacquered aluminum, and the frame is black-baked enamel.

One man can quickly set them up or knock them down by a simple swing of the legs. The legs operate in units of two. Automatic locking device with positive catch requires no manipulation.

The tops are regularly furnished with beautifully grained ply panel (5 ply graded), finished with two coats of heat and stain resisting hot-spray lacquer. All tops are oil dipped to resist warpage, and all edges are protected with an attractive steel moulding around the entire top.

Obtainable in various sizes including the rounds; also with black tempered masonite and linoleum tops.



Stacks 6 to 19½ Inches

DELUXE FOLDING CHAIRS

Hostess DeLuxe chairs depart entirely from old time construction principles. Here is a full back and full seat all-steel, all - riveted folding chair, upholstered both back and seat. When folded, the upholstering is between two protecting metal parts that form back and seat, thus eliminating danger of damage to upholstery during storage. Hostess DeLuxe chairs are obtainable in many color combinations and all metal parts are finished in beautiful metallic spray-lacquer colors. All chairs are equipped with large pure rubber feet.

CHAIR TRUCKS

Regular trucks for Hostess chairs are obtainable in two styles. Vertical 24 capacity, and Horizontal (understage) 36 capacity. Constructed of steel with ball bearing casters, swiveled in front only. Special sizes for special installations. Prints furnished upon request.

STANDARD FOLDING CHAIRS

The Standard model is a scientifically constructed chair that embodies all the features demanded by architects and school executivees. The frame is of angle iron, giving exceptional strength. This X type chair is constructed so it will not collapse, no matter how the weight is distributed.

Seat is of 5/16 inch plywood and protected against chipping by a steel band. Back panel is stamped from 20 gauge steel. All Standard chairs are bonderized before finishing. Furnished only in Brown. All chairs supplied with large rubber feet.

The new improved Standard chair is now obtainable in adjustable heights. This feature allows the Standard chair to do double duty; auditorium height or banquet height. This arrangement is an entirely new development. Details upon request only.

MITCHELL MANUFACTURING CO.

Milwaukee, Wisconsin

Playground Apparatus
Beach and Pool Equipment
Fold-O-Leg Tables

"Betterbilt"

Folding Choral Stands
Folding Band Stands
Sanitary Barn Equipment

FOLD-O-LEG TABLES

For cafeterias, sewing rooms, study tables, kindergartens, commercial departments, social rooms, recreation centers, table tennis, etc., Mitchell Fold-O-Leg Tables will satisfactorily replace the most expensive type. They are perfectly rigid because of their unique design and construction—yet each table requires only 2½ inches space when folded. Made in convenient sizes. Tops of Fir Veneer, Tempered Masonite Presdwood or Linoleum. Thousands have been re-ordered by old customers who originally tried just one table. Write today for Booklet No. 3.

300% Savings in Storage Space

25% Greater Seating Capacity

Easily Folded and Handled

Below is a partial list of schools now using Mitchell FOLD-O-LEGS:

San Bernardino High School, San Bernardino, California.
Union High School, Fallbrook, California.
Western State College, Gunnison, Colorado.
University of Idaho, Twin Falls, Idaho.
High School, Rock Island, Illinois.
Thornton High School, Harvey, Illinois.
Public Schools, Hammond, Indiana.
Purdue University, LaFayette, Indiana.
Hoover School, Flint, Michigan.
University of Michigan, Ann Arbor, Michigan.
Stillwater City Schools, Stillwater, Minnesota.
Hamilton School, St. Louis, Missouri.
High School, Scotts Bluff, Nebraska.
High School, Laconia, New Hampshire.
High School, Albuquerque, New Mexico.
Board of Education, Newburgh, New York.
High School, Hudson, New York.
State School of Science, Wahpeton, North Dakota.
Findlay College, Findlay, Ohio.
Paulding Village School, Paulding, Ohio.
Union High School, Cottage Grove, Oregon.
High School, East Berlin, Pennsylvania.
High School, Lewistown, Pennsylvania.
South Dakota State College, Brookings, South Dakota.
Bryon High School, Bryon, Texas.
Brigham Young University, Provo, Utah.
City Schools, Norfolk, Virginia.
Vocational School, Milwaukee, Wisconsin.

BOOKLETS

(Illustrated)

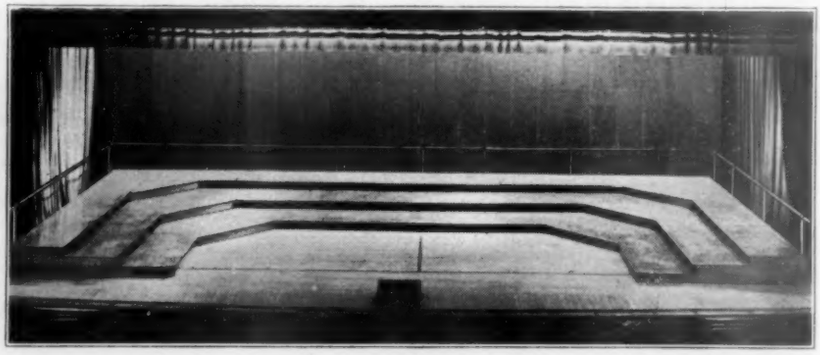
1. **"Betterbilt" Playground Apparatus—see page 291**
2. **"Betterbilt" Swimming Pool Equipment —see page 291**
3. **Mitchell Fold-O-Leg Tables**
4. **Mitchell Folding Choral Stands**
5. **Mitchell Folding Band Stands**
6. **Mitchell Sanitary Barn Equipment**

Kindergarten Size

STEEL-LEG PORTABLE FOLDING STANDS

FOR BAND, ORCHESTRA AND CHORAL GROUP ELEVATION, ALSO PLATFORMS FOR PLAYS, ETC.

Mitchell Portable Stands can be adapted to any need. Constructed in rigid units easy to handle. Rapidly moved from music room to auditorium stage or even to other places for concert work. Minimum storage space required for folded units and demountable safety steel rail. Available in any size. Thoroughly tested by many outstanding educational institutions. Write today for Booklets No. 4 and No. 5.



THE TABLET & TICKET CO.

115 E. 23rd Street
New York, N. Y.

1019 West Adams St.
Chicago, Illinois

507 Montgomery Street
San Francisco, Calif.

Since 1870

WILLSON'S GUMMED PAPER LETTERS & FIGURES

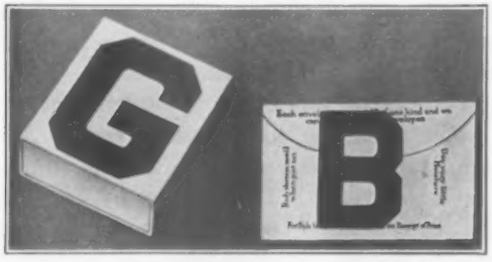
"As Easy to Use as a Postage Stamp"

THE PRODUCT

Willson's Gummed Paper Letters, Figures, Symbols and Tape are die-cut from best quality glazed, waterproof, gummed paper. They are easily applied and attractive in appearance.

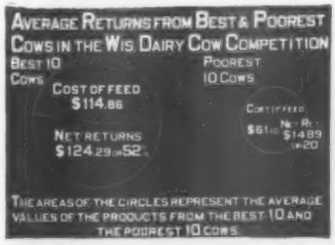
PACKING

Letters and figures are packed 10 of a character to an envelope or 100 of a character to a box. Symbols are packed in boxes of 100 only. Assortments of 1,000, 2,000 or 5,000 characters are the convenient and economical method of purchase, the envelopes and boxes being purchased as refills as needed for the handy assortment boxes.



STYLES

Three styles of letters and figures are available —Cheltenham, Block and Gothic. These styles have been standardized because of their legibility and general acceptance as most desirable for display lettering. Sizes from ⅛-inch to 4 inches high.


AVERAGE RETURNS FROM BEST & POOREST COWS IN THE WIS. DAIRY COW COMPETITION
BEST 10 COWS
POOREST 10 COWS
COST OF FEED $114.86
NET RETURNS $124.29
$52
$61.10
$14.89
1-20
THE AREAS OF THE CIRCLES REPRESENT THE AVERAGE VALUES OF THE PRODUCTS FROM THE BEST 10 AND THE POOREST 10 COWS.

USES

Willson's Gummed Paper Letters, Figures, Symbols and Tape are especially adapted for making flash cards, analytical charts and graphs, signs, indexes, marking files, records, maps, etc. Used in every type of educational and administrative work.

COLORS

Standard stock colors of letters and figures are white and black. Symbols and tape carried in white and black. Special colors cut on order. Send for catalogue.

MENU RACKS FOR YOUR CAFETERIA

"Entire Strip Changed with One Movement"

Willson's Gummed Paper Letters and Figures are used widely in school cafeterias, with our Ladder Menu Rack shown here, one of several types. Write for particulars on Cafeteria Sign Equipment.

OTHER ITEMS WE MAKE

Desk Name Signs—Door Plates and Directional Signs. We also do die-cutting of all kinds.

CHANGEABLE LETTER SIGNS AND BULLETIN BOARDS

Changeable Letter Signs provide the ideal medium for transmitting thought by means of the written word, combining all the elements of expensive hand lettered or printed signs with greater efficiency, convenience and economy. But they go beyond the ordinary field of printed or hand lettered signs and find a broad, prolific industrial field as well.

Send for complete catalogue.

TO CLASSES OF 1940
Present Your School with a
CHANGEABLE LETTER SIGN

SECTION VIII
COMMERCIAL DEPARTMENT—ADMINISTRATIVE OFFICE

RECORD-KEEPING SYSTEM, PUBLIC SCHOOLS, STAMFORD, CONN.

By

B. FRANK WHITFORD
Director of Child Accounting

and

LEON C. STAPLES
Superintendent of Schools

IN the Stamford school system record-keeping is a function of the individual schools as well as of the centralized child accounting department. This article, however, is devoted largely to the work of the child accounting division.

Taking the State Census

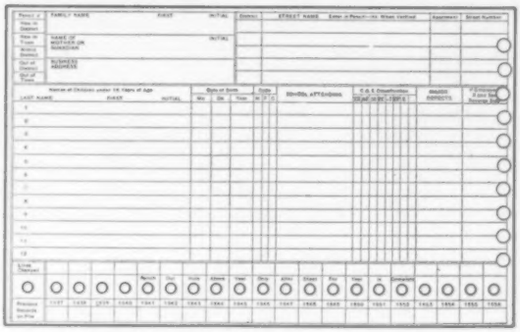
A Connecticut state law requires that an enumeration of all children between the ages of four and sixteen years be made in September of each year. Approximately 13,000 children are enumerated in Stamford. The custom had been to take the enumeration by school districts with separate returns compiled for each district. The enumerators were supplied with blank forms which were filled out for each family as a house-to-house canvass was made. This method was slow and often inaccurate. Certain family names were difficult to spell, and dates of birth frequently varied from year to year. A request from the State Board of Education that districts be combined and that the report be compiled alphabetically for the entire city made a change in this method of taking the enumeration imperative.

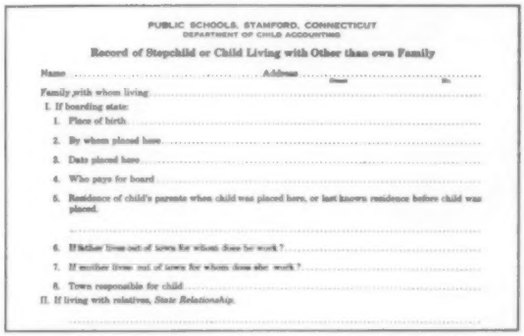
The local Board of Education decided to adopt a permanent record system that could be kept up to date the year around and that would also provide for all changes in data that would occur from the time a child became four years of age until he reached his sixteenth birthday. Permanent enumeration cards were purchased and a card was typed for every family to be enumerated. The cards provide for twenty successive enumerations and there are spaces for the names of father, mother, guardian, and children, as well as date of birth, schools attended, changes of address, reasons for non-attendance, physical defects, and employment data. These cards are filed alphabetically, but just before taking the enumeration it is necessary to rearrange them so that they are filed consecutively by streets.

Enumerators, generally ten in number, are selected from local applicants for teaching positions and are assigned to enumerate certain streets. Cards for these streets are placed in their hands and the enumeration is largely a job of checking the cards, adding new names, and filling out cards for families who moved into the city during the summer vacation. Each enumerator checks the circle over the date of the enumeration when a family has been enumerated, and also enters his initial in the square under the circle. The field work is covered in two or three weeks, while under the old system it took fifteen enumerators double the time to do the job. The enumerators turn in the cards enumerated two or three times a week, and also return the cards they are unable to enumerate with the present address of the family entered on each card, if it is possible to secure the information. The cards are checked as rapidly as they come in, and if found correct, the date circle is punched and the enumerator is given credit for the number of children enumerated. The compensation is five cents for every child enumerated.

The report to the State Board of Education, consisting of more than 300 sheets typed on both sides, is prepared as soon as the field work has been completed. One clerk is responsible for this work and has always been able to finish the job several days before the report is due, on the first of December of each year. Under the old system, several girls helped make out this report, and frequently an extension of time had to be secured from the State Department. In addition to this, a supplementary report of from ten to fifteen sheets was frequently submitted to correct

Front and back sides of the family census card, used by the enumerators in taking the school census





PUBLIC SCHOOLS, STAMFORD, CONNECTICUT
DEPARTMENT OF CHILD ACCOUNTING

Record of Stepchild or Child Living with Other than own Family

Name ..... Address .....

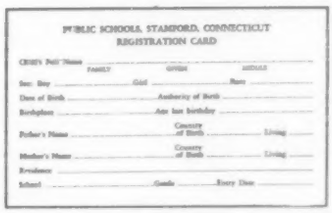
Family with whom living .....

I. If boarding state:

1. Place of birth .....
2. By whom placed here .....
3. Date placed here .....
4. Who pays for board .....
5. Residence of child's parents when child was placed here, or last known residence before child was placed.
6. If father lives out of town for whom does he work? .....
7. If mother lives out of town for whom does she work? .....
8. Town responsible for child .....

II. If living with relatives, *State Relationship.*

Census card for child whose name differs from that of parent or guardian, used especially for "placed out" children



PUBLIC SCHOOLS, STAMFORD, CONNECTICUT
REGISTRATION CARD

Child's Full Name ..... FAMILY GIVEN MIDDLE

Sex: Boy ..... Girl ..... Race .....

Date of Birth ..... Authority of Birth .....

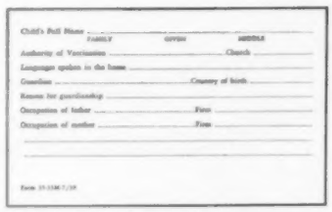
Birthplace ..... Age last birthday .....

Father's Name ..... County of Birth ..... Living .....

Mother's Name ..... County of Birth ..... Living .....

Residence .....

School ..... Grade ..... Entry Date .....



Child's Full Name ..... FAMILY GIVEN MIDDLE

Authority of Vaccination ..... Church .....

Languages spoken in the home .....

Guardian ..... Country of birth .....

Reason for guardianship .....

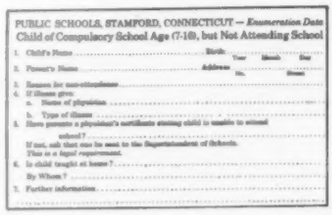
Occupation of father ..... Firm .....

Occupation of mother ..... Firm .....

Form 37-1136 7/39

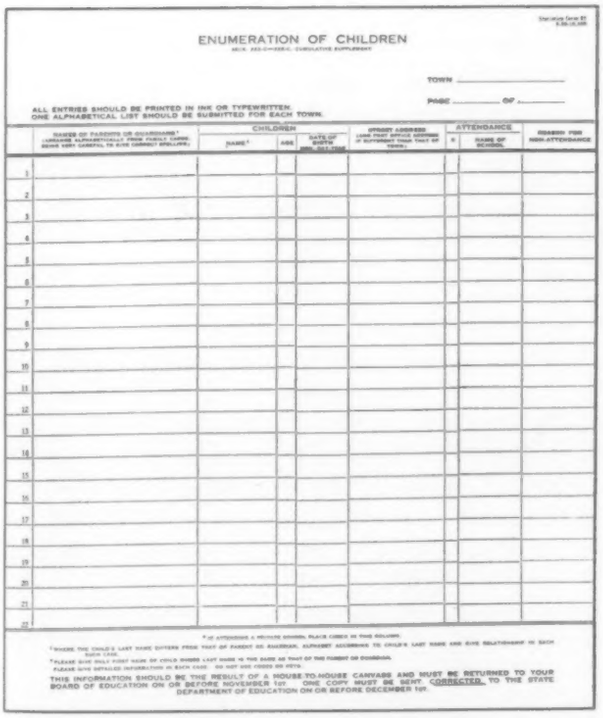
Front and back sides of the pupil registration card, used for checking school census

Card which enumerator must fill out to show why a child of compulsory school age is not attending school



PUBLIC SCHOOLS, STAMFORD, CONNECTICUT — *Enumeration Data*
Child of Compulsory School Age (7-16), but Not Attending School

1. Child's Name ..... Birth: Year Month Day
2. Parent's Name ..... Address No. Street
3. Reason for non-attendance .....
4. If illness give:
   a. Name of physician .....
   b. Type of illness .....
5. Have parents a physician's certificate stating child is unable to attend school? .....
   If not, ask that one be sent to the Superintendent of Schools.
   This is a legal requirement.
6. Is child taught at home? .....
   By Whom? .....
7. Further information .....



ENUMERATION OF CHILDREN

TOWN .....

PAGE ..... OF .....

ALL ENTRIES SHOULD BE PRINTED IN INK OR TYPEWRITTEN.
ONE ALPHABETICAL LIST SHOULD BE SUBMITTED FOR EACH TOWN.

	NAMES OF PARENTS OR GUARDIANS* (ARRANGE ALPHABETICALLY FROM FAMILY NAME. BEING VERY CAREFUL TO GIVE CORRECT SPELLING)	CHILDREN NAME*	AGE	DATE OF BIRTH (MO., DAY, YEAR)	STREET ADDRESS (AND POST OFFICE ADDRESS IF SUPPOSED TO BE THAT OF TOWN)	ATTENDANCE #	NAME OF SCHOOL	REASON FOR NON-ATTENDANCE
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								

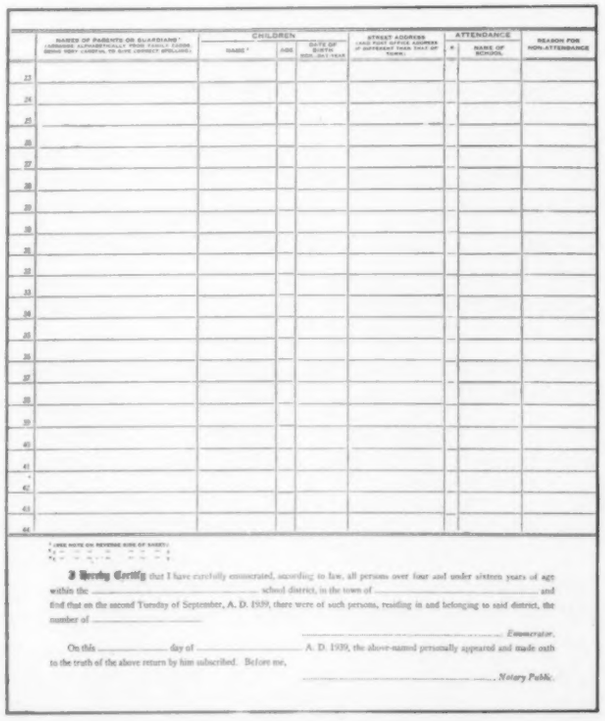
* IF ATTENDING A PRIVATE SCHOOL, PLACE CODE IN THIS COLUMN.

† WHERE THE CHILD'S LAST NAME DIFFERS FROM THAT OF PARENT OR GUARDIAN, ALPHABET ACCORDING TO CHILD'S LAST NAME AND GIVE RELATIONSHIP IN EACH SUCH CASE.

* PLEASE GIVE ONLY FIRST NAME OF CHILD UNDER LAST NAME IN THE SAME AS THAT OF THE PARENT OR GUARDIAN.
PLEASE GIVE DETAILED INFORMATION IN EACH CASE. DO NOT USE DITTO OR DITTO.

THIS INFORMATION SHOULD BE THE RESULT OF A HOUSE-TO-HOUSE CANVASS AND MUST BE RETURNED TO YOUR BOARD OF EDUCATION ON OR BEFORE NOVEMBER 1st. ONE COPY MUST BE SENT, CORRECTED, TO THE STATE DEPARTMENT OF EDUCATION ON OR BEFORE DECEMBER 1st.

Front and back of enumeration compilation sheet. Report to the State Board of Education is made on this sheet



	NAMES OF PARENTS OR GUARDIANS* (ARRANGE ALPHABETICALLY FROM FAMILY NAME. BEING VERY CAREFUL TO GIVE CORRECT SPELLING)	CHILDREN NAME*	AGE	DATE OF BIRTH (MO., DAY, YEAR)	STREET ADDRESS (AND POST OFFICE ADDRESS IF DIFFERENT THAN THAT OF TOWN)	ATTENDANCE #	NAME OF SCHOOL	REASON FOR NON-ATTENDANCE
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								
33								
34								
35								
36								
37								
38								
39								
40								
41								
42								
43								
44								

* SEE NOTE ON REVERSE SIDE OF SHEET.

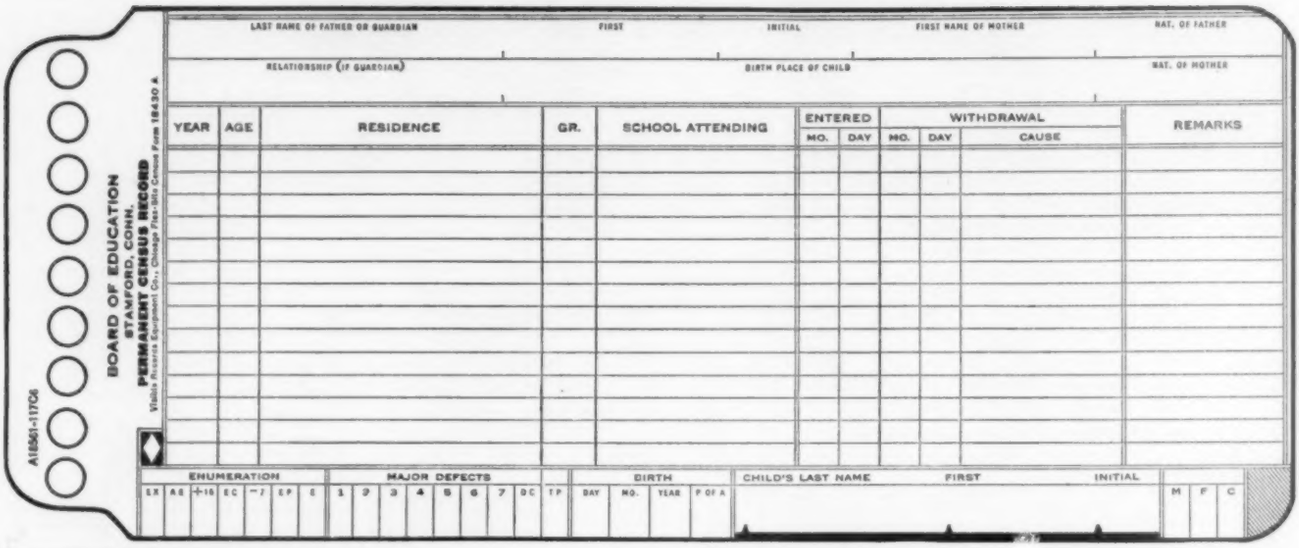
I Hereby Certify that I have carefully enumerated, according to law, all persons over four and under sixteen years of age within the ..... school district, in the town of ..... and find that on the second Tuesday of September, A. D. 1939, there were of such persons, residing in and belonging to said district, the number of .....

..... *Enumerator.*

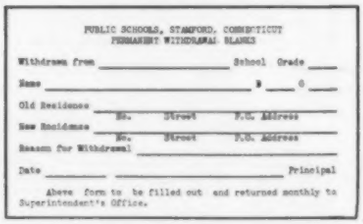
On this ..... day of ..... A. D. 1939, the above-named personally appeared and made oath to the truth of the above return by him subscribed. Before me,

..... *Notary Public.*

Forms Used in Taking School Census and Making Report to State Board of Education



Above and on opposite page—Front and back sides of the permanent individual census record slip



PUBLIC SCHOOLS, STAMFORD, CONNECTICUT
PERMANENT WITHDRAWAL BLANKS

Withdrawn from _____ School Grade ____

Name _____ B ____ G ____

Old Residence _____
No. Street P.O. Address

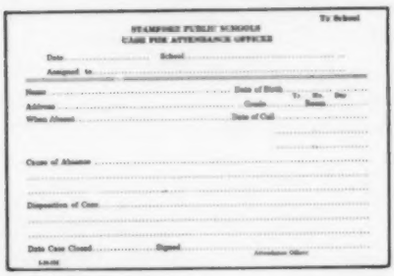
New Residence _____
No. Street P.O. Address

Reason for Withdrawal _____

Date _____ _____ Principal

Above form to be filled out and returned monthly to Superintendent's Office.

Change of address card, used in keeping permanent census records up to date



To School

STAMFORD PUBLIC SCHOOLS
CASE FOR ATTENDANCE OFFICER

Date _____ School _____

Assigned to _____

Name _____ Date of Birth _____ Yr. Mo. Day

Address _____ Grade _____ Room _____

When Absent _____ Date of Call _____

Cause of Absence _____

Disposition of Case _____

Date Case Closed _____ Signed _____

Irregular attendance slip, used when a case is referred to the attendance officer for investigation

errors and to furnish additional information needed by the State Department.

The first step in preparing the state report is to arrange the cards alphabetically. This is done mechanically by running a wire through holes punched along the right-hand edge of the cards. Certain holes are slit which permit the cards to drop out in alphabetical order as the wire is passed through each successive hole. Only ten holes are used, and there is a space of a quarter of an inch between each two holes. The code for slitting the cards was worked out by the director of our Child Accounting Department and is so arranged that a maximum number of cards drop out with a minimum number of holes slit. In all, about 300 combinations are assembled, and the cards will pile up in alphabetical order so far as the first two letters of a name are concerned. For example, S's will drop out: Sa, Sc, Se, Sh, Si, Sk, Sl, Sm, Sn, So, Sp, St, Su and Sw. The final stage of the sorting has to be done by hand but has proved to be an operation of short duration. The opposite end of the cards may be punched and the holes slit so that the cards may be mechanically sorted by streets.

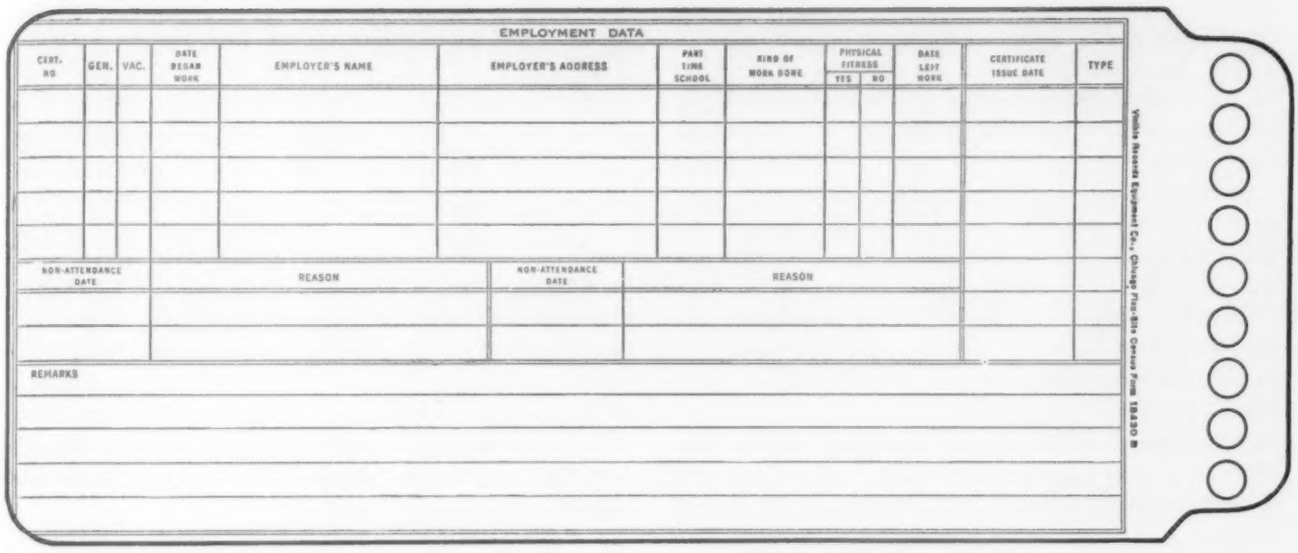
Before typing the state report, the cards are checked with registration cards turned in by all the public and private schools in Stamford. Errors are thus located and corrected, and names omitted by the enumerators are added.

The Permanent School Census Records

Our permanent records are prepared by transferring the data appearing on both enumeration and registration cards to Permanent Individual Census Record sheets. These sheets are arranged to show at a glance the information that is collected from year to year for every child in the city. Permanent record binders are used for filing these sheets. The binders are 12 inches in width, 16 inches in height and about 4 inches in thickness and are reinforced with steel strips which make them very durable. Each binder has a capacity for about 1,200 records. Eleven binders are required to provide for our present needs. Each page of the binders contains a maximum of 32 names, all visible. The alphabetical order of the names always remains intact, since individual records may be inserted or removed on any of the pages by simply pressing a spring and moving a lever. Small binders the exact size of the individual record sheets are also provided for filing records that are no longer active.

Additional Special Files

Besides the files already described, our office contains a visible filing cabinet for truancy and at-


EMPLOYMENT DATA

CERT. NO	GEN.	VAC.	DATE BEGAN WORK	EMPLOYER'S NAME	EMPLOYER'S ADDRESS	PART TIME SCHOOL	KIND OF WORK DONE	PHYSICAL FITNESS YES	PHYSICAL FITNESS NO	DATE LEFT WORK	CERTIFICATE ISSUE DATE	TYPE

NON-ATTENDANCE DATE	REASON	NON-ATTENDANCE DATE	REASON		

REMARKS

Visible Records Equipment Co., Chicago Plus-Six Census Form 18430 B

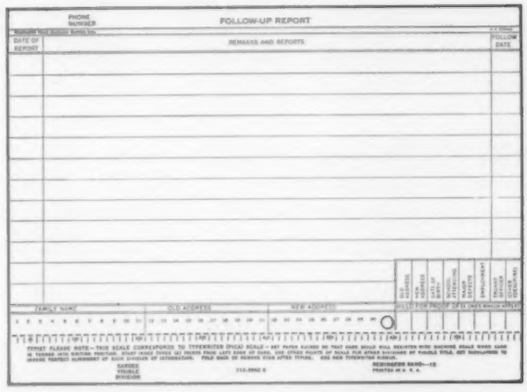
Individual data of successive enumerations are recorded on these slips for filing in permanent record binders

tendance records and court proceedings. Individual scholarship records and physical and mental tests are available in another file. Records of exceptional children and children physically handicapped are also kept. There is a file for children of compulsory school age who are not attending school, giving reasons for non-attendance, and a special card for children not living with their own parents. This card contains the name, address, and place of birth of the child; also the name of the family with whom he resides, placement data, source of support of the child, and information regarding the child's father and mother. If the child resides with a relative, the relationship is stated. Cards with information concerning withdrawals, new pupils, and changes of address are sent in by the schools every week in order that all files may be kept up to date. Thus it is possible to keep more closely in touch with conditions that may affect the progress made by a pupil.

Permanent Student Records

New permanent records, used for the first time this year, are filed in visible filing cases in the various schools. These records are the outcome of painstaking work on the part of a committee of Stamford teachers and supplant the old-time record cards, which afforded little, if any, assistance in solving the problems vital in the education of the child of today.

Since the Child Accounting Department had no part in the preparation of these records, Reginald Neuwien, the Stamford principal who was chairman of the committee that drew up the plan, was asked to describe the forms. His article follows:


PHONE NUMBER — FOLLOW-UP REPORT

DATE OF REPORT	REMARKS AND REPORTS	FOLLOW DATE

FAMILY NAME — OLD ADDRESS — NEW ADDRESS

Individual irregular attendance card, used for follow-up report

The committee which prepared the new record felt that the record should help those interested in the child to have a more complete understanding of him, help to solve his present problems, and, most important, help to ward off potential problems. Further, the record should be a single complete record from kindergarten through senior high school. Physically, the card should be compact and in a very usable form.

The resultant card was a 5 x 8-inch three-fold card, 8 x 14 inches when open. This type of card provided six working spaces, which were broken down as follows:

Form 1.—*Permanent Student Record,* which contains the child's name, sex, race, birthplace, birth date, authority for birth, vaccination, names of father and mother, their country of birth, their occupation, where employed, guardian's name, if any, the reason for guardianship, child's address, school, grade, date of entry, year's attendance, record of discharge.

Form 2.—*Pupil Activities-Guidance Record,* which contains space for extra-curricular activities, participation in sports, special abilities and disabilities,

photograph, social agency contacts, church, languages used in the home, home conditions, as divorce, etc.

Form 3.—*Elementary School Record,* which provides for the yearly recording of the child's academic record, teacher's name, child's social attitudes, and a personality chart.

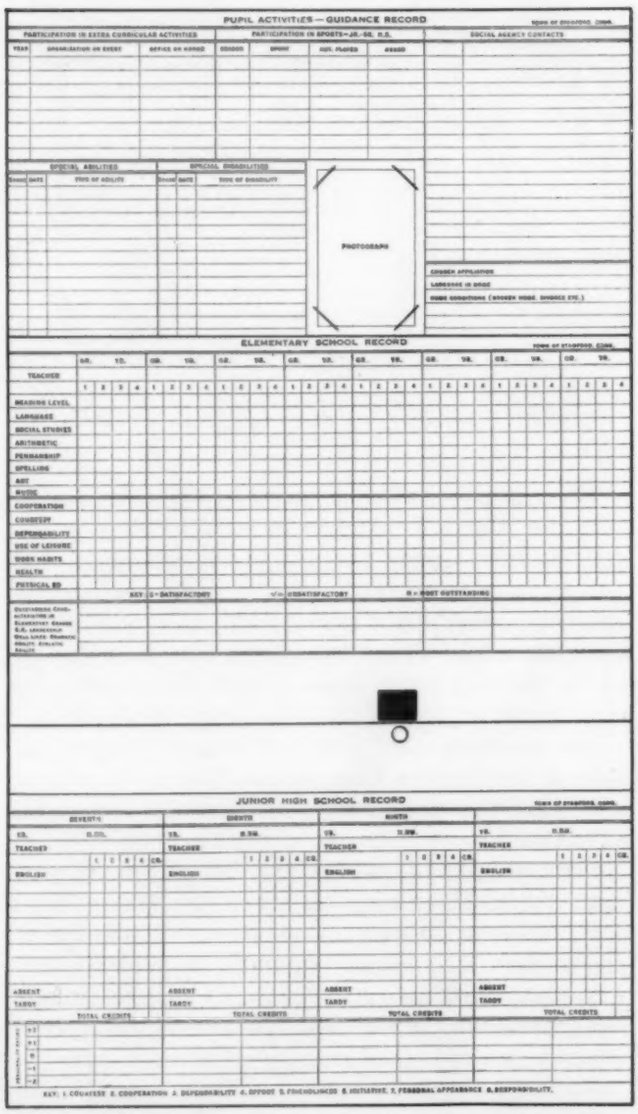
Form 4.—*Junior High School Record,* which provides for the yearly recording of the home-room teacher's name, child's academic record, credits attained, and a personality rating chart.

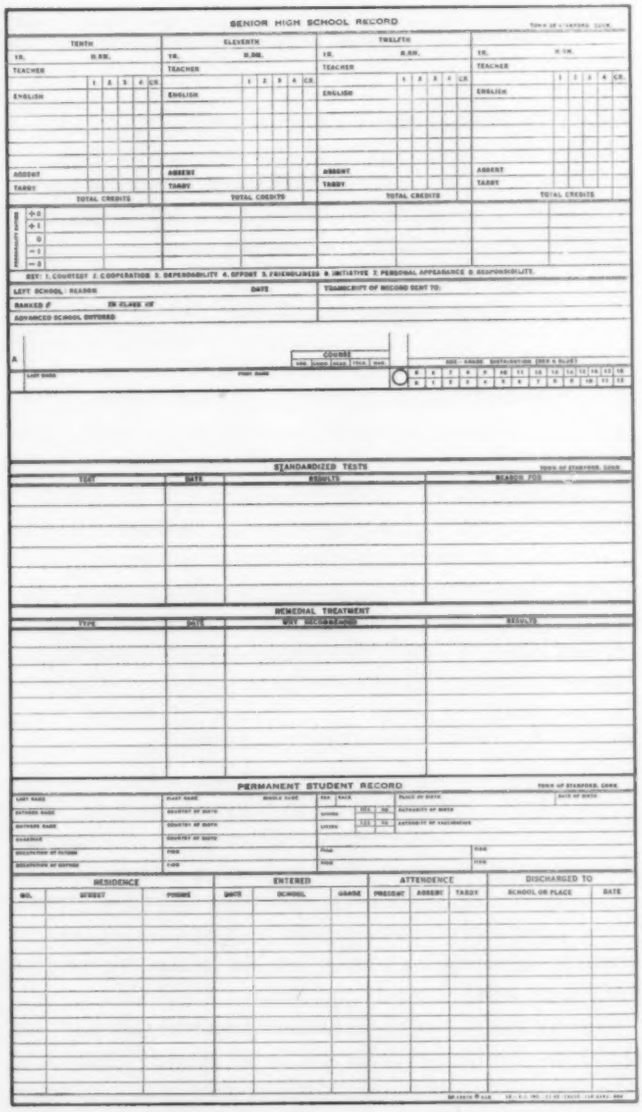
Form 5.—*Senior High School Record,* which provides for the yearly recording of the home-room teacher's name, child's academic record, credits attained, personality rating scale; also, for the high-school record, why the child left school, ranking in graduating class, record of transcripts sent, advanced school entered.

Form 6.—*Test Results,* which records the type of test, date of administration, results, reason test was given, and remedial treatment and results of this treatment.

The visible edge of the card contains the child's last name, first name, and age, also grade distribution scale. The visible edge also shows a green signal for attendance problems, and a red signal for children with heart ailments. In the elementary grades the cards are filed in individual book folders, one class to a book. In the Junior and Senior High Schools the cards are filed in floor cabinets, which can be readily rolled to the place where the records are to be used.

The records were transcribed as a WPA project under the direct supervision of the School Department, and the records are now in use in all the Stamford schools.





The permanent student record forms are retained in the various school offices and filed in the child accounting office only after pupils have been discharged from the system

LAYOUT AND EQUIPMENT FOR BUSINESS EDUCATION DEPARTMENTS ON THE SECONDARY-SCHOOL LEVEL

By M. E. STUDEBAKER

Head of Department of Business Education, Ball State Teachers College, Muncie, Ind.

IT IS impossible in an article of this kind to set up a standard to be followed by all schools in planning the rooms and equipment to be used by their business education departments. No two schools have the same conditions to consider in making plans for their business education department. Some of the problems that various schools have will be mentioned, and some types of equipment will be suggested to meet the various situations. Since most of the public high schools offering business education may be classified as small schools, greater emphasis will be placed on the layout and equipment needed for such schools.

Questions to Be Answered

Of major importance in considering equipment for the business education department of a high school is the location of the school. Is it in an urban or a rural community? If it is in an urban community, are opportunities present for employment of high-school graduates in business offices? If so, what kind of business jobs are available for the high-school graduate trained in business? Is the community able to finance a well-equipped and adequately administered department of business education in its high school?

The general administrative policy of the school should receive consideration. Are classes in the high school ordinarily large or small? Is the teaching load heavy? Are teachers required to supervise extra-curricular activities? Is a minimum amount of professional training and/or teaching experience required of all teachers? Is the administration in sympathy with the work of the department of business education? The answers to these questions, as well as to others, will have an important bearing on the type and equipment necessary for the business education department of any high school.

Where Should Business Subjects Be Taught?

The major objective of the work in business education must be considered in determining the amount of equipment to be used. For some time, business subjects have been taught in junior high schools. This has been true particularly in reference to typing, junior business, and commercial arithmetic. At the present time, there is a trend towards placing all courses in business education offered by secondary schools in the senior high school only. It is thought that boys and girls of junior high-school age lack the maturity necessary to master the skills required for vocational efficiency and to analyze and interpret facts pertaining to business operations. For this reason specialized training is being deferred until the boy or girl reaches the senior high school. Certain educators maintain that specialized business training should be deferred until the junior college period of training. The fact that there are more boys and girls graduating from public high schools than formerly, and that there are fewer opportunities for these boys and girls to secure business jobs, provides a good argument for this proposal.

Only a few of the larger cities have special high schools of commerce, and there seems to be little demand that more of them be organized. The tendency seems to be to reorganize such special high schools as we now have, and only in those cities where the special high schools are successful in finding jobs for their graduates can their continuance be justified. In most cases a sufficient amount of specialized training for the jobs available may be offered in the cosmopolitan high school.

There was a time when it was felt that actual office and business situations should be set up. Such a set-up is not found today unless in the case of high schools where specialized training in business is provided. But the majority of high schools do not offer such specialized training. Teaching methods are changing. No longer do multitudinous vouchers, forms, and blanks play a large part in giving instruction in bookkeeping.

Business education must assume its responsibility in the general education of all boys and girls. Every individual, at some time or other, is face to face with a problem concerning business practices and policies. It is therefore essential that all individuals have an understanding of the fundamental principles of business. The consumer or personal-use value of a knowledge of business customs is of importance to every individual. The social-business or economic objective of business education aims to give the boys and girls information *about* business that will make them better citizens. Every high school is therefore faced with the responsibility of providing for all pupils business education that will enable them to take their

places in this modern world as better consumers and better citizens. Schools located in communities where business jobs are available for high-school trained business graduates have the added responsibility of providing specialized business training for those jobs.

Choosing the Type of Equipment

The type of equipment needed will therefore be determined by the type of training to be offered. The size of the department likewise must be considered. At this time, from 25 per cent to 33⅓ per cent of all pupils enrolled in the public high schools are taking work in the business education department. The larger the school, the more pupils there will be in business education. Hence, more rooms and more equipment will be necessary. The opposite is true for the smaller school. It is apparent that the kind of equipment used for the large school may not be suitable for the small school.

The enrolment of a small school may be such that one room will be used for all classes in business education. Tables or desks suitable for shorthand, bookkeeping, or junior business may not be suitable for typing. The drop type desk is used in many schools for this purpose (Figure 1). With a limited number of pupils a desk of this kind is satisfactory. In certain cases the cost is considered too high, but the greatest objection to equipment of this type is that expensive typewriters are available for use only when the room is being used for typing classes. Ideally, typewriters should be available for practice purposes at hours other than the class period.

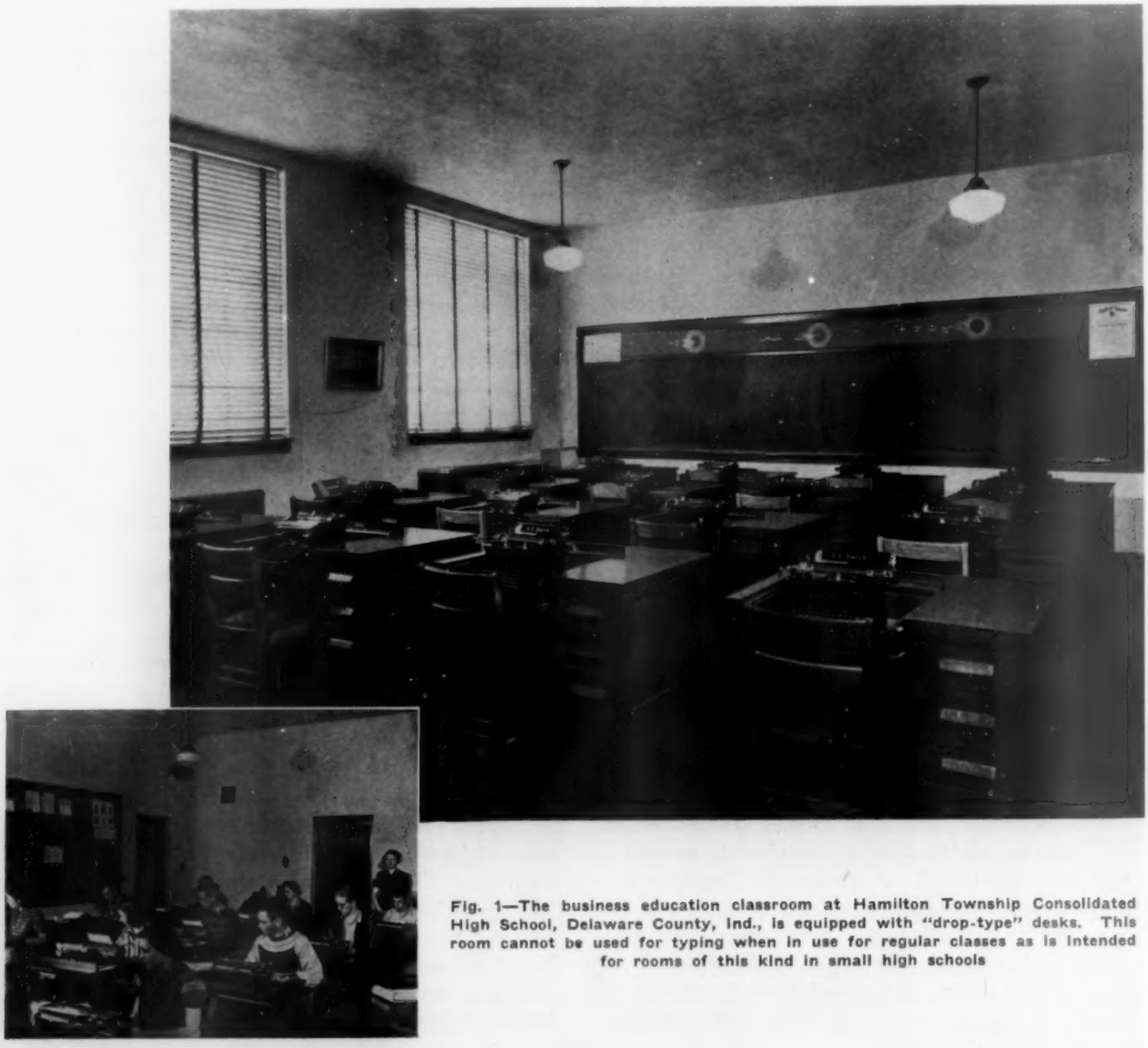


Fig. 1—The business education classroom at Hamilton Township Consolidated High School, Delaware County, Ind., is equipped with "drop-type" desks. This room cannot be used for typing when in use for regular classes as is intended for rooms of this kind in small high schools

Fig. 2—Classroom, Burris Laboratory School, Ball State Teachers College, Muncie, Ind. This room is used for business education classes such as bookkeeping, shorthand, junior business, and selling

No matter how small the school or how small the enrolment, two rooms should be the minimum number for the use of the business education department. One of these rooms should be used for typing and the other for a classroom. The larger the school and the larger the enrolment in the business education department, the more rooms will be needed for typing, for classrooms, and for office or clerical practice.

The Equipment of Burris School

Burris School, the campus laboratory school of Ball State Teachers College, is forbidden, by contract with the city schools, to enroll more than 700 pupils. For that reason it does not care to enroll more than 200 pupils in the tenth, eleventh, and twelfth years. A room 23 x 37 feet has been provided for a classroom, a room 23 x 42 feet for typing, and a room 12 feet 6 inches x 18 feet for office machines, together with two faculty office rooms. These rooms have been planned and equipped to render the maximum service. The needs of the pupils as well as of the instructors have been considered in determining such equipment as desks, chairs, bookcases, filing cabinets, lighting facilities, color scheme of floor, walls, blackboards, and bulletin boards.

The classroom (Figure 2) has a tan floor covering, dark-brown blackboards, light-brown cork bulletin boards, a lemon painting on the upper walls, and a white ceiling, as its color effect. Yellow chalk is used for writing on the blackboard. It has 24 individual flat-top desks with ample room for adding 10 or 12 more. The tops of these desks are 24 x 34 inches.

Courtesy The Peabody Seating Company

Fig. 3—A desk used for class work, showing special compartment for placing books and papers when not in use

Each desk has space under the top for placing books and papers not being used (similar to Figure 3). Two inkwells are provided. The desks are of uniform height, but the chairs are adjustable. Two large tables are placed in the back part of the room for special work or for adding or calculating machines that may be used in bookkeeping classes. Concealed electric connections are placed at various places in the floor for the use of electrical equipment.

The typing room (Figure 4) has a green floor covering, dark-green blackboards, light-green cork bulletin boards, light sea-foam green painting on the upper walls, and a white ceiling, as its color effect. Acoustic boards are used on the ceiling to reduce the noise from operating typewriters. Yellow chalk is used for writing on the blackboard. It has 35 individual typewriting tables with ample space for aisles and between the tables. The tables are of various heights, and the chairs are adjustable. Two large tables are placed at the rear for special work. A built-in bookcase provides a place for books and typing copy for student and for teacher use. A built-in cabinet is located under the blackboard at the side of the room. Electric connections are concealed at various places in the floor for the use of electric typewriters and other electrical equipment.

Fig. 4 (below)—Typing room, Burris Laboratory School, Ball State Teachers College, Muncie, Ind. Note different heights of desks. The ceiling is acoustically treated

Fig. 5—Typing classroom at Pendleton High School, Pendleton, Ind. The limited aisle space makes it difficult for the teacher to move about from pupil to pupil in order to answer questions and demonstrate procedures

The office practice room, although small, provides sufficient room for the number of pupils enrolled at Burris. It has a stencil type duplicator, a stencil scope, a liquid type duplicator, a billing machine, a listing machine, and a calculator. Other equipment is to be added.

It may be said in passing that, for the benefit of the teacher, typing tables should be grouped so as to give free access to each pupil in order to answer questions and demonstrate proper procedures.

Many typing rooms are too small to provide sufficient aisle space (Figure 5). The teacher must overcome this inconvenience the best he can. It may mean fewer questions, fewer requests for demonstrations. The final result will tell whether or not this has handicapped the pupil in his progress.

Individual typing tables of various heights with the adjustable chair enable the teacher to seat pupils in such a way as to provide the greatest ease in typing as far as posture is concerned (Figure 6).

The equipment for Burris School provides the necessary tools for giving the boys and girls information about business as well as for offering a limited amount of specialized business training for those who are interested and for whom business jobs are available. There is nothing special about this equipment that

Fig. 6 (below)—An adjustable chair for use in typing enables the pupil to have correct posture

Courtesy The Peabody Seating Company

Fig. 7—Office machines room—A class in machine transcription is shown at work at Western High School, Baltimore, Maryland

could not be used in any small high school. Furthermore, it is a type of equipment that may be used in any high school, large or small. The rooms do not vary greatly in size from those used for other classes.

Compromise Sometimes Necessary

In planning the rooms to be used by any department it is frequently necessary to make the plans fit the rooms that are to be used. It is not always possible to plan rooms for a new building that are exactly as they should be to provide the best space and arrangements for the department. It may be that a window or a door cannot be placed in a certain position because of a ventilator shaft, a solid wall, or some other construction feature that the architect claims is necessary in the general construction of the building. The location of the rooms on certain sides of the building may cause problems of proper lighting.

For the most part, this discussion has been devoted to the needs of the small school. The larger school must have more equipment, particularly in office machines (Figure 8). Whether the beginning typing classroom has typewriters all of one make will depend on the number of typing rooms available.

Each school should provide the best equipment adapted to its individual needs which it is financially able to supply. In the final decision the teacher and the pupil must have due consideration.

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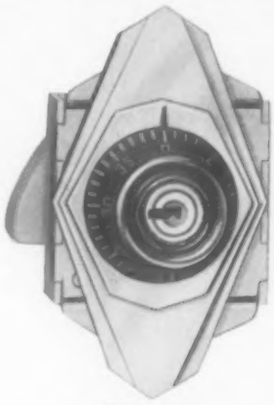

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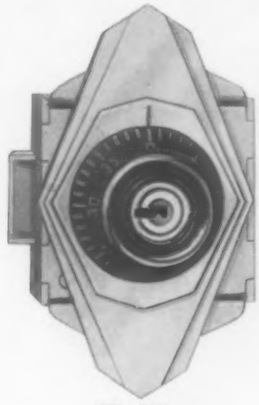
Master Keyed Combination Self Locking, for use on Lockers having spring latch bar. Over 64,000 different combinations available. No bolt or rivet heads visible from outside. Can also be furnished without Master Key feature.



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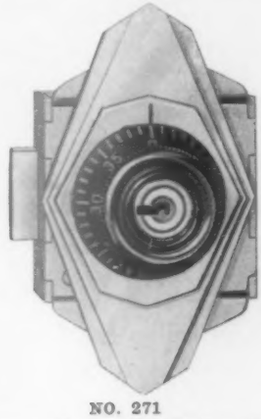
For use on Box type Lockers having no latch bar. Lock has beveled spring bolt. Closing door locks lock and spins dial concealing last figure of combination. Furnished with or without Master Key feature.



NO. 271

Master Keyed Combination Dead Bolt Lock having square end dead bolt. Lock does not have self-locking feature. Combinations of this lock and Nos. 267 and 269 can easily be changed by removing escutcheon plate and turning dial.

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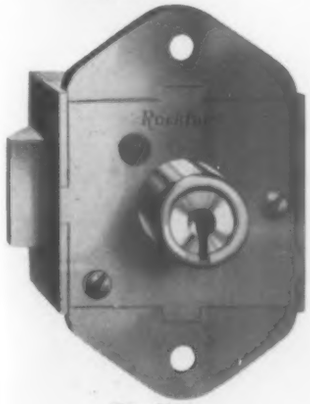

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NO. 2600

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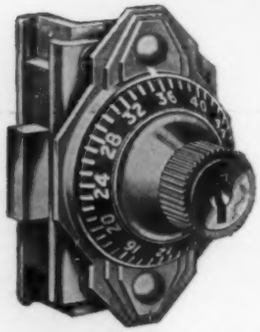

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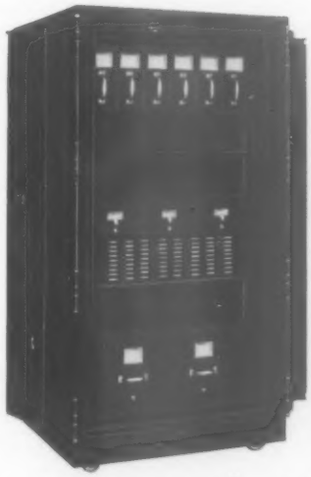

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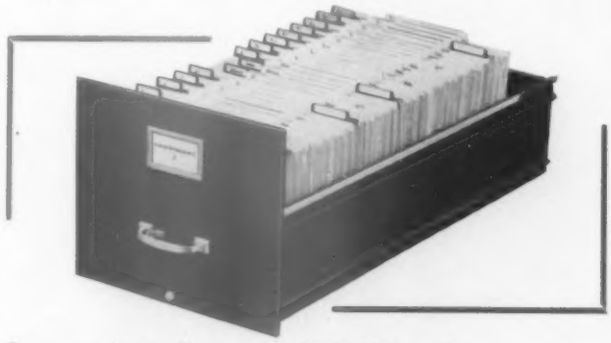

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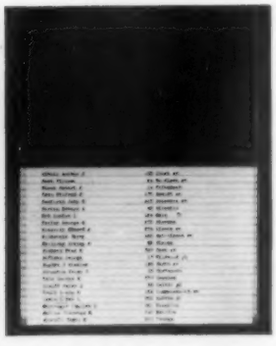

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Available in either aluminum or bronze. Narrow frames provide a maximum display space, yet do not detract from the beauty of the surroundings. Cases may be provided with light fixtures to afford proper illumination of contents.

Full sweep of complete Remington Rand Library Equipment servicing the library of Brooklyn Technical High School, Brooklyn, N. Y.

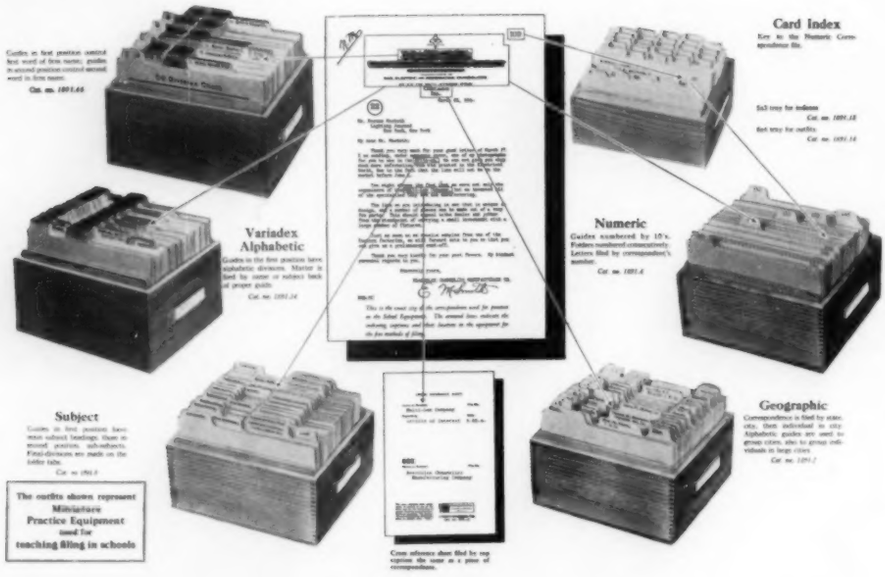
REMINGTON RAND INC., ADDITIONAL LIBRARY EQUIPMENT and SUPPLIES

- Steel Book Shelves
- Section Label Holders
- Unit Shelving Combinations
- Book Cases
- Office Desks
- Round Library Tables
- Sloping Top Tables
- Library Chairs
- Card Catalog Cabinets
- Information Files
- Newspaper Racks
- Dictionary Stands
- Bulletin Boards
- Book Trucks
- Waste Baskets
- Exhibition Equipment
- Wardrobe and Supply Cabinets
- Overdue Postcards
- Non-Loseable Book Supports
- Poster Holders
- Date Slips
- School Signature Record
- L. B. Paste
- X-L Lock Binders
- New Thrift Pockets
- Accession Books
- Application Cards
- Charging Trays
- Charging System Guides
- Periodical Record Cards
- Vertical and Visible Filing Supplies
- Mending Tools and Materials
- Rubber Dates

Standard Library equipment is carried in stock in quarter-sawed white oak and white maple. Equipment of other woods or of special designs may be furnished on request. For more detailed information in regard to construction or dimensions, send for catalog. Check, sign and mail the postcard today.

FOR 64 YEARS THE MOST FAMOUS NAME IN ITS FIELD

PRACTICE EQUIPMENT *for* COMMERCIAL CLASSROOM INSTRUCTION



PRACTICE FILING OUTFITS

Remington Rand's Library Bureau Practice Method of Teaching Filing is unique in that it brings the student into direct contact with actual filing work. "Learning by doing" is the guiding principle of this new plan of learning to file. Students of this course first familiarize themselves with the essential rules of indexing. Then they apply these rules by becoming "file clerks" in a fictitious New York City company. They file miniature correspondence in miniature folders behind miniature guides. Thereby, learning to master the intricacies of the various forms of filing.

PROGRESSIVE INDEXING and FILING TEACHERS' KEY and TEACHERS' GUIDE

Written in a clear, comprehensive manner, "Progressive Indexing and Filing" furnishes an outline and supplementary material for the practice course in filing. Carefully planned, progressive steps, from elementary essentials to the more advanced phases of filing, aid the teacher who conducts the course. Pertinent questions at the end of each chapter suggest points for class discussion and recitation. Supplementing this text are a Teachers' Key and Teachers' Guide. Both booklets serve as an aid in presenting the subject of filing. They also assist in checking and measuring the work which the students perform with the practice outfits.

VISIBLE RECORD OUTFITS

New Remington Rand practice method is designed to acquaint students with the fundamentals of visible record control. Each pupil works with a model visible system, sets up the record, makes entries, establishes a visible signal control and draws conclusions from the posted facts. A full-sized 6-tray Kardex Cabinet is furnished. Five of the slides are fitted with cards illustrating personnel, prospect, stock, ledger and sales records. The sixth slide has Kardex pockets only. Teacher's task made easy by following authoritative textbooks and guides. Schools purchasing a complete set of visible record equipment are entitled to a free correspondence course and Question and Answer service.

ALPHABETIC INDEXING and FILING WORK BOOK

A new Work Book supplements the textbook, "Progressive Indexing and Filing." Contains definite rules and standard practice instructions conducive to simplified filing methods observed in business offices. Material written in clear, thorough manner, easy for students to absorb. Over 100 job lessons carry students through all phases of indexing and filing. Large quantity of perforated sheets follow job assignments. Each sheet in turn perforated to make six filing slips. Slips can be used as cards.

REMINGTON RAND CLASSROOM PRODUCTS

- Textbooks on Visible Record Keeping.
- Textbooks on Filing.
- Practice Equipment for Teaching Filing.
- Demonstration Material for Office Practice.
- Bookkeeping Instruction Equipment.

AN UNIQUE IDEA ORIGINATED BY THE MASTERS OF FILING PROCEDURE

. . . PORTABLE TYPEWRITERS
the most complete line in the world

New Deluxe Noiseless Portable.

New Premier Portable.

Remington Rand Model 1 Deluxe.

WHAT can I do to get better grades in school, is the question most often asked of teachers by students. Individual aptitude plays a major role in school work of course, but until recently there was nothing in the answer that could be applied alike to all students regardless of special aptitudes.

The findings of two of the country's most prominent educators changed all that! A series of tests over a period of two years proved conclusively that most pupils showed a marked improvement in their lessons when using a Portable Typewriter. Further proof was furnished that through the use of the Portable Typewriter students were able to concentrate better on their work. More and better composition was the result. Another phenomenal outcome was that self expression was promoted to a very high degree, even among shy students. Punctuation was better. History, Science, Geography and Arithmetic all were favorably influenced. Quite beyond this general improvement in school grades—there is a direct advantage in forming the typing habit early. In High School and College the great amount of writing that must be done is not only handled easier and more quickly with greater accuracy but with far less effort with a Portable Typewriter.

This lifetime benefit of owning a portable goes even farther than school. For in adult life many daily tasks such as Social Correspondence, Lecture Notes, preparation of speeches, demand much more time than most of us can spare, unless they are taken care of through typing.

We shall be very glad to furnish you a digest of the study made by two eminent educators upon request to F. J. Hastings, Remington Rand Inc., Buffalo, N. Y.

The New Remette.

Junior Deluxe.

Streamline Model 5.

SCIENTIFIC STUDY DISCOVERS A NEW VALUABLE EDUCATIONAL TOOL

QUIET COMES TO THE AMERICAN SCHOOL AND OFFICE

REMINGTON DELUXE NOISELESS

Quiet typing is rapidly becoming a MUST in today's business world. Thus, more and more, schools and offices everywhere are being equipped throughout with this marvelous Noiseless typewriter.

Built on the now famous Remington Noiseless pressure printing principle this deluxe typewriter marks another milestone in Remington pioneering ingenuity.

The Remington Noiseless not only turns out BETTER LOOKING LETTERS . . . BIGGER VOLUME WITH LESS EFFORT . . . FINER STENCILS . . . MATCHLESS MANIFOLDING . . . but its results ARE FAR REACHING ENOUGH TO FAVORABLY INFLUENCE HEALTH, BEAUTY, EFFICIENCY . . . PROFITS FOR THE OWNER and REMUNERATION for the OPERATOR.

THE WORLD'S FINEST TYPEWRITER

COMPLETELY NEW

THE NEW REMINGTON MODEL 17

Completely new, the Model 17 has no equal in standard typewriters. It has truly been called the "ideal standard" typewriter for schools and offices. It has every feature of style—beauty—convenience and performance. Many of them are exclusive.

The amazing Model 17 revolutionizes all previous conceptions of typewriter value with such exclusive features as Endicator, Jam Trip, and many others. Ask any Remington representative for a tree trial of these machines in your classroom or office.

REMINGTON NOISELESS AND NEW MODEL 17 FOR SCHOOL AND OFFICE

ADDING—CALCULATING—BOOKKEEPING MACHINES
for Business Office and Commercial Classrooms

MODEL 490-ZF

Non-Descriptive Posting Machine

Every commercial student deserves thorough instruction on this type of machine, for he will encounter thousands like it throughout the business world. This is one of a group of machines featuring the famous Dalton keyboard, an exclusive arrangement of only 10 numeral keys, scientifically designed for swift, one-hand, "touch method" operation. This model is equipped with front-feed carriage, whose widespread adoption by businessmen almost demands that the student be thoroughly familiar with its operation. The Dalton carriage opens and closes automatically—and when closed, it locks the forms firmly into posting position. The machine prepares statement, ledger and journal simultaneously, and is quickly adaptable to many different accounting procedures—a feature of utmost importance in a commercial classroom instruction machine, and a major reason why Dalton model posting machines have long been preferred by profit-minded executives.

MODEL 285—WORLD'S ONLY

Completely Electrified Bookkeeping Machine with Automatic Balances

Here is the most amazingly flexible bookkeeping machine available today—so versatile, in fact, that this one machine is ideally suited for classroom instruction in every type of accounting—receivables, payables, payroll, stock record, trust accounting—to name but a few. In a matter of seconds, the machine may be adapted from one type of accounting to any other . . . This same flexibility serves not only the commercial classroom but the school office as well. Budget accounting—investment ledgers for endowment funds—tuition and term bills—students' accounts . . . these and other essential administrative records are produced by the world's only completely electrified bookkeeping machine with automatic balances.

The WORLD'S ONLY *Printing* CALCULATOR *with Automatic* DIRECT DIVISION

Scientific computing instruction is promoted by the Printing Calculator. This machine displays all the principles of mechanical computing, and is especially valuable in classroom instruction because it is the only machine in the world which prints on a tape a record of every step in the computing process. At examination time, the student submits one complete unbroken tape not merely as a record of the finished work but as a means for the teacher to check how quickly the individual student has grasped the principles involved . . . In the school office, too, the Printing Calculator is an invaluable business aid. It divides automatically and prints dividend, divisor, quotient and remainder. It multiplies and prints multiplicand, multiplier and product. The printed tape eliminates all necessity for copying figures from dials or repeating the work to prove accuracy.

ELECTRIC PORTABLE ADDING MACHINE

MODEL 9381-5

Because more and more business offices are standardizing on 10-key listing-adding machines, this model is practically a "must" in every well-equipped commercial classroom. The most completely electrified adding machine of the day, it lists and totals 8 columns, provides direct subtraction, fast multiplication, and feature keys—Sub Total, Total, Correction, Non-Add, Subtract—each of which is fully electrified. It is easy to carry, easy to put away—and its rugged mechanism stands up brilliantly under the terrific abuse which every practice machine must endure.

FOR FULL DETAILS ON ADDING--BILLING--BOOKKEEPING MACHINES—*Check and Mail the POSTCARD Today*

REMINGTON RAND INC., BUREAU OF EDUCATION
BUFFALO, NEW YORK

Please send me, free of cost or obligation, full details on the subjects checked:

- ☐ Safe-Files and Safe-Cabinets (Government Narrator No. 11)
- ☐ Variadex
- ☐ Kardex
- ☐ Kolect-a-Matic
- ☐ Library Bureau Equipment
- ☐ Practice Filing Equipment
- ☐ Portable Typewriters
- ☐ Noiseless Typewriters
- ☐ Model 17 Typewriters
- ☐ Model 490-ZF Posting Machine
- ☐ Model 285 Bookkeeping Machine
- ☐ Printing Calculator
- ☐ Portable Adding Machines
- ☐ Tabulating Machines

Name .....

School .....

City ..... State .....

TABULATING MACHINES *for Accounting . . . . for Financial Statistics . . . for Classroom Instruction*

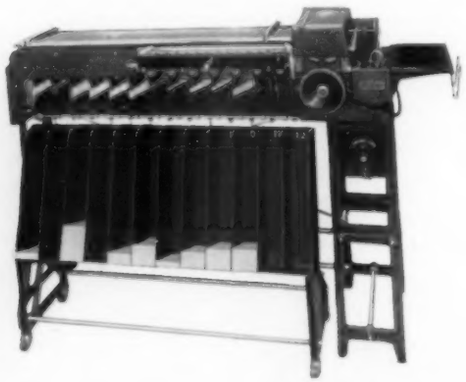
PUNCHED-CARD BOOKKEEPING

A NEW, Low-Cost Accounting Method of Especial Interest to School Superintendents and University Business Officials . . . .

New? Decidedly . . . for although the punched-card principle is actually 40 years old, it is very new when measured against the centuries of bookkeeping history.

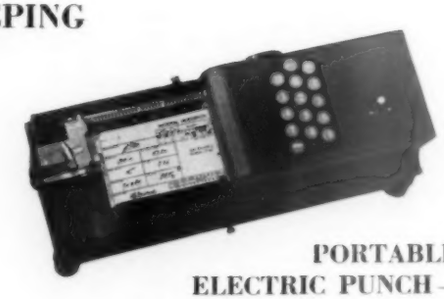
In the university and school business office, all basic accounting information is available on forms of various kinds and sizes—invoices, departmental budget estimates, supply requisitions, bills, vouchers, receiving slips, to name but a few. No machine known to man will automatically arrange, classify and tabulate this information from the original documents, *but*—when the information is transcribed by means of holes punched into tabulating cards of uniform size, the basic records can then be mechanically sorted and automatically tabulated into complete reports. Manual transcribing for classifying and posting is unnecessary. Useful reports, previously impractical to produce, are now readily available. The whole concept of accounting procedure is changed.

Remington Rand Tabulating Machines are ideally suited to the specialized accounting work of educational institutions—appropriation accounting, plant and equipment depreciation, tuition bills, instructors' and employees' payroll, accounts payable. They may be leased for as little as a junior clerk's salary, or they may be purchased outright, like typewriters, filing cabinets and other office supplies.



TYPE 220C SORTER

mechanically selects and arranges cards in any desired order, at the same time automatically counting the cards as they are being sorted. The machine also delivers sub totals and grand totals. Ideal for school attendance statistics, class registration statistics, library circulation analysis and library acquisition control.



PORTABLE ELECTRIC PUNCH—

measuring 18x8 inches and weighing only 26 pounds, proves the adaptability of Remington Rand equipment to even the smallest school administrative office. "Baby" of the complete line of 20 Remington Rand Punches, it is widely used by business schools for training America's future tabulating machine operators.

PUNCHED-CARD ACCOUNTING IS SIMPLE, FAST, ACCURATE!

1 ***Punch***

A tabulating card is only 7⅜ inches long and 3¼ inches wide, yet it can contain 90 columns of alphabetical-numerical information. The average operator can punch 200 to 300 such cards per hour. Once punched, the cards are permanently accurate, for the holes cannot move. Contrast this with the errors in manual posting—errors which even the most efficient bookkeeper cannot avoid.

2 ***Sort***

25,200 column sorts per hour, which the Remington Rand Sorter assures, is unquestionably the fastest known method of arranging cards automatically into desired groups.

3 ***Tabulate***

Remington Rand Tabulators transcribe the punched holes into alphabetical or numerical printed reports—printing from 30 to 85 figures simultaneously in one line and recording from 60 to 120 of these lines every minute . . . the fastest known method of printing information and totaling it.

TYPE 230 TABULATOR

is the lowest-priced in the wide range of Remington Rand tabulators. This model prints and totals up to 30 figures on one line simultaneously, at 60 lines per minute. At the other end of the scale is a tabulator printing and adding 85 figures per line at 100 lines per minute. In between are 70 other tabulators, each one able to solve a specific accounting problem cheaper and faster than any other method.

GET THE WHOLE FASCINATING STORY WITHOUT OBLIGATION

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FIRST CLASS
PERMIT No. 147
Sec. 510, P. L. & R.
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BUSINESS REPLY CARD
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2c POSTAGE WILL BE PAID BY—

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465 Washington Street
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BUREAU OF EDUCATION

B 600

ART METAL CONSTRUCTION COMPANY

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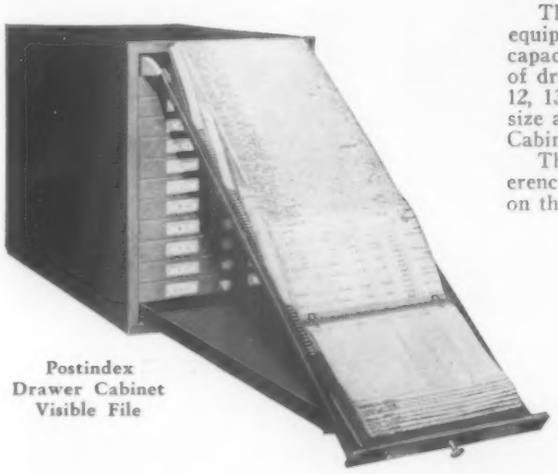
600 SALES AGENTS IN ALL PRINCIPAL CITIES

POSTINDEX MODEL 8 DRAWER CABINETS



Postindex Drawer Cabinet Visible File

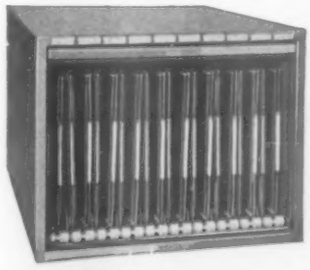
The Postindex Drawer Cabinets are generally accepted as standard equipment for many school record requirements. They are available in capacities arranging from 500 to 2,500 records, depending upon the number of drawers and card size selected. Standard cabinets are available in 6, 7, 12, 13, 19 and 20 drawer heights, and a large variety of card sizes. Any size and any capacity may be provided for in the Postindex line of Drawer Cabinets.

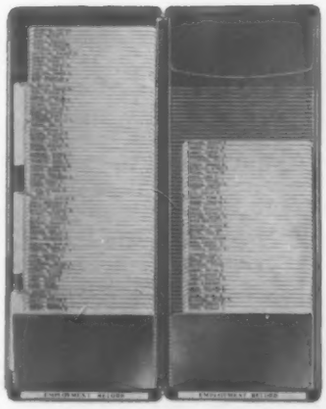
This line of Postindex equipment is especially convenient for quick reference purposes since the proper drawer may be quickly located by the index on the front, and as quickly extended for finding of the card or record desired. Postindex is also fastest for posting purposes as posting is done without taking the form out of the file.

This type of equipment gives an unusually fine appearance in offices where attention to such refinement is desired. A single cabinet or a battery of these cabinets may be put on a roller caster stand so the installation may be rolled to different locations in the office, or up alongside a certain desk, when particularly desired for prolonged reference or posting.

The trays are quickly removed in case it is desirable to temporarily separate one or several trays from the installation for reference and posting at some other location. The standard trays have on an average of 90 records per tray. This varies slightly one way or the other depending upon the size of the card.

Write for Circular





MODEL 5 FLAT BOOKS AND CABINETS

Model 5 Flat Books are most widely used among school administrators because they are readily adapted to either large or small installations and because of compactness and the convenience in handling. Flat Books are easy to post because they lie flat on the desk. A large number of records are seen at one time as an average Flat Book will hold 140 records. The books furnish a fully protected unit to carry about to any part of the building. They lend themselves ideally to housing in safes when not actually in use. Books may be purchased one at a time to add to present installation. Flat books are made of aluminum and very light to handle.

Write for Circular

POSTINDEX MODEL 1 RAPID STACKS

The Postindex Rapid Stacks are the answer to a situation where it is desired to have each grade or each teacher's record definitely separated from the other records. Each panel in the 5, 10 or 15-panel Rapid Stack has a capacity of 40 to 50 records depending upon the visibility. This is almost always sufficient to cover the number of students in one grade or in one teacher's room.

Where this type of unit is used, the entire set of records is kept in the Principal's office in the Rapid Stack at all times except at the period when it becomes necessary for a teacher to take her panel of records to her own room for posting. This is convenient for both the teacher and the Principal, and eliminates conflictions at times when teachers will be doing posting at the same time, to the student records cards.

The Rapid Stack occupies very little desk room and furnishes quick reference because the panels may be pulled down to any section desired. The unit is light being made principally of aluminum so it can be easily lifted from the desk to a safe for protection.

Write for Circular

THE SELF-ALIGNING TRUNNION WIRE MAKES POSTINDEX

Slip It Through the Form

Just "thread" the trunnion wire through the two holes in the four-page form. It's done in a split second — for it's the most natural of actions — and small or large forms are handled equally fast

Snap It in Place

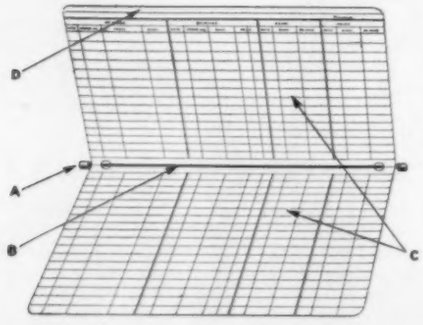
Engage the trunnion under the channel ledge. Then, bending the wire slightly — it's oil tempered steel for the purpose — snap the other trunnion in place. It's all done with the proverbial "twist of the wrist"

POSTINDEX FOUR-PAGE FORM

The Postindex four-page form is ideally adapted to many of the various school accounting records because of the great amount of recording space provided. For instance, it makes possible on one form a complete cumulative student record covering scholastic record, attendance, extra curricular activities, intelligence tests, achievement tests and such other related data, so that it is possible for the school administrator to have complete information at hand in connection with child guidance.

All four pages of such a card are independently accessible for posting and reference as the card lies in the file, making it easy to turn to any section of the record desired.

The spring wire and trunnion card-holder provides an ideal means of attaching auxiliary records to the master form in such a way that essential additional information may be had all in the same place about the same subject or student. See Postindex regular catalog for many other features.



THE SIMPLICITY OF THE POSTINDEX VISIBLE FILE PRINCIPLE

A. This is the trunnion that operates in the channel at the side of the panel.

B. This is the anti-rust tempered spring wire card holder. Form may be inserted or removed from panel instantly.

C. This shows two pages of the four-page form, which gives a writing area on an 8 x 5 inch form of 160 square inches, equal to a ledger page of 10 x 16 inches.

D. This shows the visible line where are typed the name and address or the subject of the record.

SLIDES INTO TYPEWRITER

Postindex records can be indexed and prepared for use on any standard typewriter. As soon as the form is indexed it is ready for mounting on the trunnion wire as shown in the illustrations, the form being properly slotted for the purpose at the factory. Each form is also properly scored at the factory for even, easy folding. Thus the forms can be indexed as required at any time. No attachment is needed on the typewriter—or on the card—for indexing purposes, nor does any part of the form have to be torn off after indexing.

DOUBLE INDEX PREVENTS ERRORS

Postindex speeds up the posting, finding and record keeping side of business so tremendously because it is, in itself, such an error-proof system. Thanks to its construction—the hanging of each form from an individual trunnion wire—it is possible to index each four-page form from both front and back. In this way, the index is always visible whether the forms are in the down or upstanding position. This advantage of equally simple "two way" operation is a very real one. As shown by the three positions of the four-page form here illustrated, every part of the record is equally easy to work on, to find or to post. The correct index always in sight safeguards against errors and the time lost in correcting them.

The double index, with 100% visibility at all times, is another important factor in making Postindex the fastest of posting systems. The principle of double indexing is carried on through all phases of a Postindex installation. Each four-page form is double indexed—each tray is double indexed—and each folded insert sheet can also be double indexed, which means greater accuracy as well as greater speed.

THE TRUNNION MAKES THE DIFFERENCE

Postindex is simpler — faster — more flexible and more versatile—because of the exclusive Postindex patented Self-Aligning Trunnion Wire. It's so simple in itself—the trunnion—that its importance cannot be overemphasized. It permits Postindex to operate as no other system can operate. For you will only find the trunnion—with the greater speed and simplicity it effects—in Postindex Files.

THE EASIEST SYSTEM TO INSTALL, OPERATE AND MAINTAIN

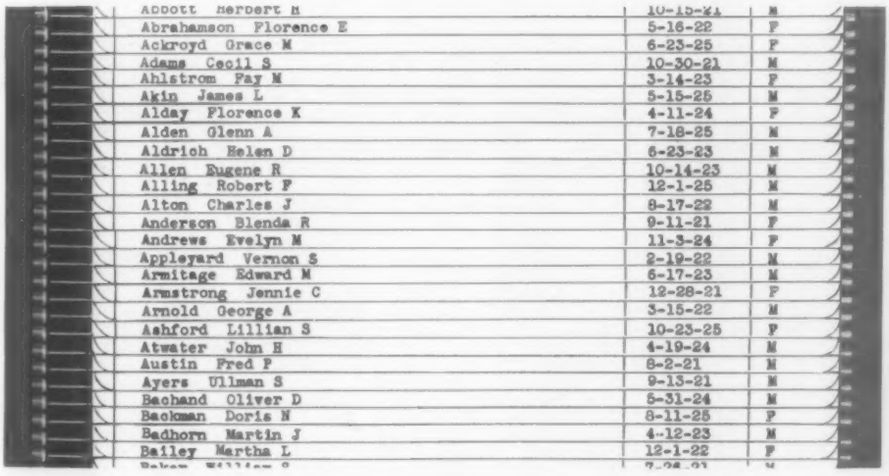
Shift It as You Please

You can remove the units and shift or rearrange them at will. Just pick up the wire, disengaging the trunnion on either side of the channel. And you can shift a handful of forms as easily as a single unit

One Hand Posting
As Only Postindex Gives It to You

Note the perfect lay-back of the forms — because of the trunnion action — which keeps the left hand free for "finding" while the right hand is free for posting

INDEX ALWAYS IN SIGHT AND ALWAYS IN PLACE



Abbott Herbert H	10-15-21	M
Abrahamson Florence E	5-16-22	F
Ackroyd Grace M	6-23-25	F
Adams Cecil S	10-30-21	M
Ahlstrom Fay M	3-14-23	F
Akin James L	5-15-25	M
Alday Florence K	4-11-24	F
Alden Glenn A	7-18-25	M
Aldrich Helen D	6-23-23	M
Allen Eugene R	10-14-23	M
Alling Robert F	12-1-25	M
Alton Charles J	8-17-22	M
Anderson Blenda R	9-11-21	F
Andrews Evelyn M	11-3-24	F
Appleyard Vernon S	2-19-22	M
Armitage Edward M	6-17-23	M
Armstrong Jennie C	12-28-21	F
Arnold George A	3-15-22	M
Ashford Lillian S	10-23-25	F
Atwater John H	4-19-24	M
Austin Fred P	8-2-21	M
Ayers Ullman S	9-13-21	M
Bachand Oliver D	5-31-24	M
Backman Doris N	8-11-25	F
Badhorn Martin J	4-12-23	M
Bailey Martha L	12-1-22	F

As this "close-up" view of a Postindex tray shows very clearly, each form unit is held in precisely uniform alignment and "exposure" with all of its neighbors. Here again, the patented trunnion is directly responsible for a highly important Postindex advantage. For a system cannot be a true time saver when it requires constant realignment, adjustment or correction —the kind of attention Postindex does not require.

Note the military precision of the trim-rounded trunnion ends. The shoulder-to-shoulder position of the trunnions makes it impossible for any one form unit to "hide" under the form above or below it. Thus the index line always has 100% visibility—so important for swift fact and figure finding and equally important in posting.

HINGE CLIPS FOR SINGLE CARDS

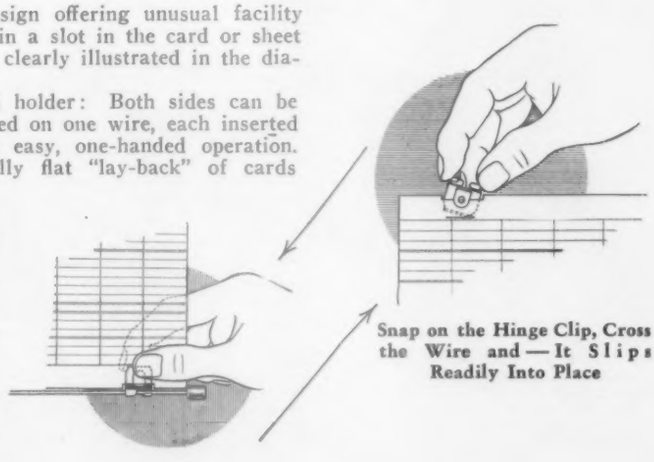
ARTINDEX Hinge Clips are metal tabs of patented design offering unusual facility and freedom of handling. The tongue of the clip engages in a slot in the card or sheet which is thus securely held. The use of the Hinge Clip is clearly illustrated in the diagrams on this page.

Here are some of the many advantages of this new card holder: Both sides can be posted without removal from holder. Two cards can be used on one wire, each inserted and removed independently. Insertion and removal is an easy, one-handed operation. There's no slipping or tearing out of clips. Exceptionally flat "lay-back" of cards either way.

Your present vertical file can be converted, to give you the many advantages of Visible Filing. And give them to you easily and quickly! The Hinge Clip holder makes this change, without even copying old records or new cards. This saves time—saves money—saves material.

Artindex Hinge Clips slip off easily without mutilation of cards or hinges when cards are to be transferred to a vertical file.

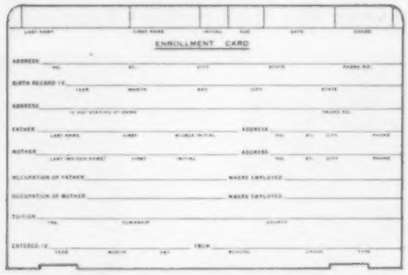
Using the Hinge Clips, the average rate of change-over is a thousand cards a day. Tabs need not cover printing on forms. Ask for a sample Hinge Clip and card, and name the record and quantity you use.



Snap on the Hinge Clip, Cross the Wire and — It Slips Readily Into Place

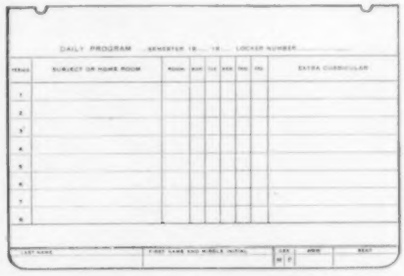
Individual School Census Card

Postindex form 81-C-6385-8. This shows one side of a two-page card which incorporates complete census information and attendance information. The back side of this card shows history of employment



School Enrollment Card

Postindex form 81-B-2916-8P. This is a two-page form with illustration showing the enrollment record. The back side of this same card covers daily program record



Individual Child's Daily Program

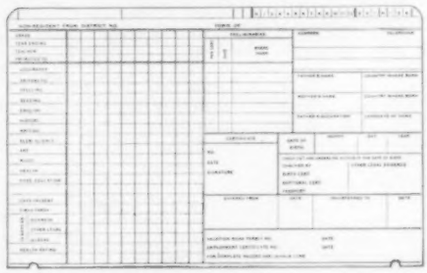
Postindex form 81-B-2913-8. This is a four-page form with illustration showing the daily program for a student. The other pages are devoted to registration information and attendance

Individual Pupil Cumulative Record

Postindex form 81-C-06072-8CT. This illustration shows one page of a four-page form covering educational history, ability and achievement test record. The other three pages provide for scholarship record and health information

Secondary School Cumulative Record

Postindex form 81-C-05971-8CT. This illustration shows one page of a four-page form with academic record and attendance information. The other three pages provide for general information, extra curricular activities, achievements, with space for intelligence and achievement tests

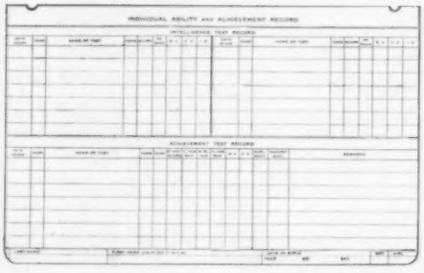


School Cumulative Record

Postindex form C-4077-P. This is a four-page form with illustration showing the elementary scholastic record. One of the other pages covers scholastic record for Junior and Senior High School while the other two pages provide space for recording pupil activities, guidance facts, intelligence and achievement tests

Individual Health Record

Postindex form 81-C-06121-8CT. This is a four-page record with illustration showing a portion of health history. The other three pages are devoted to a continuation of the same record

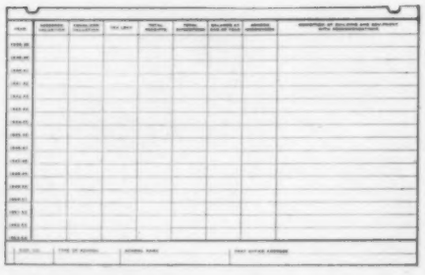


Individual Achievement Record

Postindex form 81-C-6387-8. The illustration shows front side covering intelligence tests and achievement tests. The back side is a continuation of achievement tests

Teacher's Card

Postindex form 81-C-06112-8CT. This is a four-page record with illustration showing teacher's experience. The other three pages are devoted to personal information, educational background, special training and certification, health and general remarks



County Financial Accounting Record

Postindex form 81-C-06111-14CT. This is a four-page form with illustration showing financial record. Other pages are devoted to census, enrollment, attendance and information about board members, also State and County financial support

Florida Form

Postindex form 81-C-6370-8. This is a four-page form with illustration showing the teacher's certification, extension and renewal record. The other three pages are devoted to experience, training and general information

Wisconsin Form

Postindex form 96-C-5740-14. This is a four-page form with illustration showing State Aid data. The other three pages provide record in regard to statistical information, census, enrollment and teachers

ART METAL for the ADMINISTRATIVE OFFICE

The Art Metal Construction Company, Inc., offers a functional application of its products and services to modern school building situations. The scope of its furniture—from the most modern desks, tables, bookcases, safes and visible files for the administrative office to special equipment for the library, corridor, laboratory, shop lecture rooms and storeroom—is an illustration of its wide interests and services.

VERTICAL FILES

"Director" Files for every standard record in units from desk-high to five-drawer sizes. These highest grade files have lifetime ball-bearing roller suspensions and a new, improved side-lock compressor

ART METAL AIRLINE DESKS

Art Metal's new desk creation is the Airline which has gracefully rounded Island Bases under each pedestal and black artolin top with white satin finish hardware

Airline desks may also be equipped with the new Art Metal Fold-O-Way typewriter device and as in all Art Metal desks, may be exactly fitted to the work of the user and includes all types of desks required in the school office

STORAGE CABINETS

Art Metal Storage Cabinets for all storage purposes come in single and double door widths, also in desk heights and may be had with wardrobe fittings

FIRE SAFES

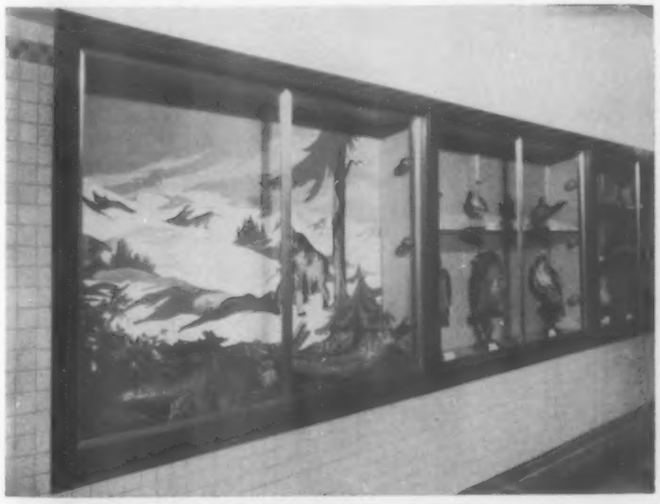
Art Metal Fire Safes, available in twenty styles and sizes, preserve valuable records against fire or theft. Tested and approved by the Underwriters' Laboratories

ART METAL PLANFILES

The exclusive feature of Art Metal Steel Planfiles consists of compression pockets which hold drawings, tracings, blueprints, in folders—upright, flat and perfectly smooth

BOOKSHELF UNITS

This is the famous Space-A-Shelf unit using the Art Metal library shelf adjustment principle. Detachable end panels are used to save space in batteries of units —especially suitable for schools



MUSEUM CASES

Shown at the left is a recessed wall case about 12 feet long and equipped with semi-indirect lighting which emenates from behind the central pilaster. This case has sliding doors. Cases can also be furnished with doors hinged at the top or side, also with removable panels. A case of this kind is particularly advantageous for displaying educational exhibits

Art Metal flag, trophy and museum cases are of patented dust-tight construction and may be had in table type or free standing cabinets with or without shelves and with glass solid backs for the display of exhibits as required by schools

ART METAL LOCKERS FOR THE SCHOOL

Built on the unit principle, each with its own welded front frame and door of 16-gauge best furniture grade steel. When arranged in groups or back to back, single walls and backs are used; one wall partition between two lockers side by side, or one back between two rows of lockers. The louvres turned inward give full ventilation without projecting beyond the door panel. The vertical V-grooves stiffen the door.

With the new pre-locking feature the locker cannot be left unlocked when door is closed.

All Art Metal Lockers, except compartment lockers, are equipped with padlock eyelets. When spring bolt locks are specified for compartment lockers, padlock eyelets are omitted.

COMBINATION LOCK N. L. CO.
268 Keyless
267 Masterkeyed

SINGLE TIER LOCKER
32 Different Sizes

GYM SUIT LOCKER
27 Different Sizes

COMBINATION SHACKLE LOCK
266 Keyless
265 Masterkeyed

Art Metal Locker Installation, Gaylord Independent School, Gaylord, Minn.

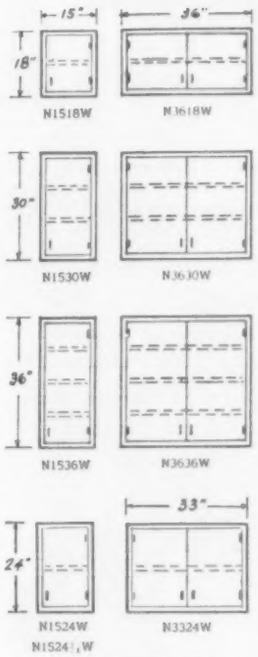
Art Metal Locker Installation, Western High School, Detroit, Mich.

SINGLE TIER LOCKERS Nominal Sizes of Lockers, In.			DOUBLE TIER LOCKERS AND GYM SUIT LOCKERS Nominal Sizes of Lockers, In.									COMPARTMENT		
Width Over-all	Depth Over-all	Height	Width Over-all	Depth Over-all	Height	Width Over-all	Depth Over-all	Height	Width Over-all	Depth Over-all	Height	Width Over-all	Depth Over-all	Height
9	12	60	9	12	72	9	12	30	15	12	36	15	15	15
9	15	60	9	15	72	9	15	30	15	15	36	12	12	12
9	18	60	9	18	72	9	18	30	15	18	36	12	15	12
12	12	60	12	12	72				18	18	36	15	21	12
12	15	60	12	15	72	12	12	30	9	12	42	15	15	14⅜
12	18	60	12	18	72	12	15	30	9	15	42	15	21	14⅜
12	21	60	12	21	72	12	18	30	9	18	42			
15	12	60	15	12	72	9	12	36	12	12	42			
15	15	60	15	15	72	9	15	36	12	15	42			
15	18	60	15	18	72	9	18	36	12	18	42			
15	21	60	15	21	72	12	12	36	15	12	42			
18	12	60	18	12	72	12	15	36	15	15	42			
18	15	60	18	15	72	12	18	36	15	18	42			
18	18	60	18	18	72									
18	21	60	18	21	72									
18	24	60	18	24	72									

ART METAL FOR THE DOMESTIC SCIENCE ROOM

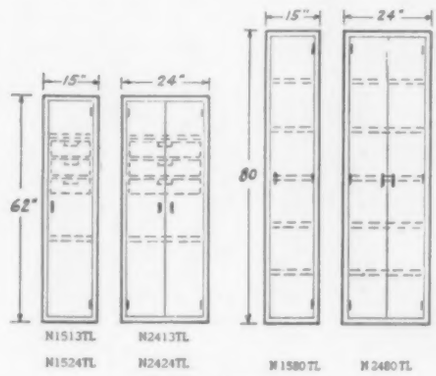
Art Metal standard under sink cabinets meet all requirements of home-making laboratories and they are being installed in a growing list of schools throughout the country. Art Metal also has the facilities for designing special equipment as needed and the services of our consulting staff are available to any school on request.

Art Metal cabinets for home-making rooms are taken from the widest range of types and sizes on the market. They are built for extreme durability and incorporate the most advanced ideas in construction and design developed in 50 years manufacturing experience. Typical units that can be supplied from stock are shown on this page. They are available at intervals of 6″ in width between the extremes of sizes shown. Requests for quotations on special sizes are invited.

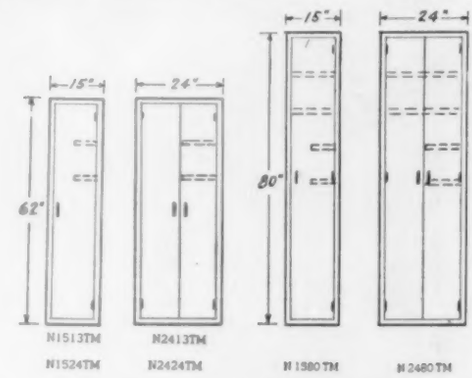


WALL CABINETS

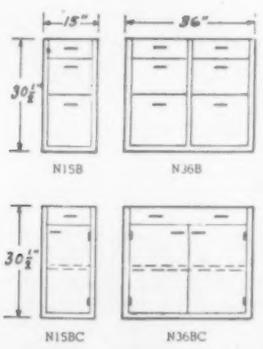
24½" deep



LINEN CABINETS

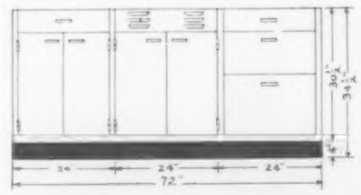


CLEANING IMPLEMENT CABINETS

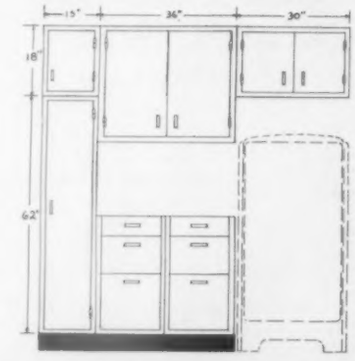


BASE CABINETS

13" deep



TYPICAL ARRANGEMENT FOR AN UNDER SINK CABINET

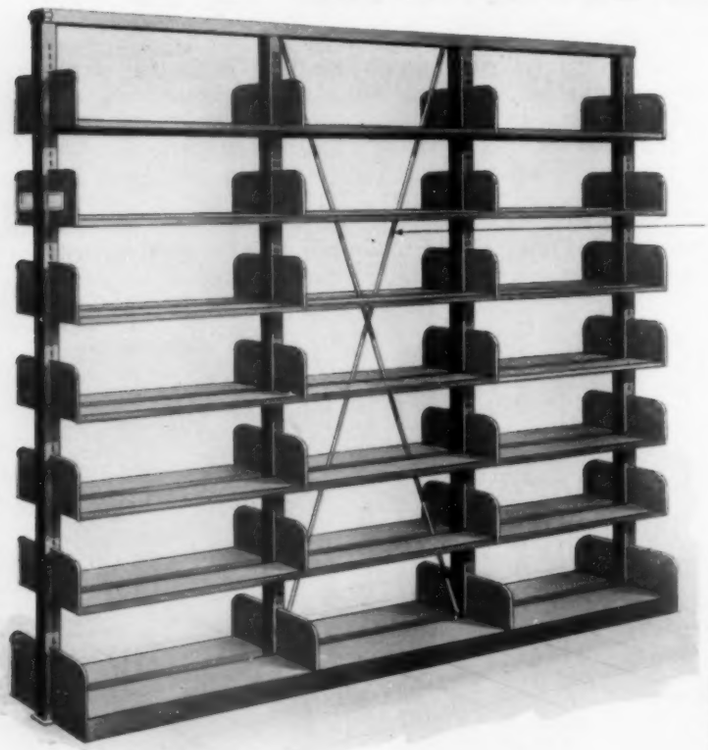


TYPICAL ARRANGEMENT FOR WALL AND BASE CABINETS

The domestic science room of the St. Louis Park School, St. Louis Park, Minn., is typical of many Art Metal installations. Architects, Haxby & Bissel

Another typical Art Metal installation of a high-school home-making laboratory at Mound, Minn.

ART METAL FOR THE SCHOOL LIBRARY



ART METAL "UNITYPE" BOOKSTACKS

Two types of UNITYPE Bookstacks are offered (as shown on this page): Free-Standing Stacks and Top-Braced Units, both models single or double-faced.

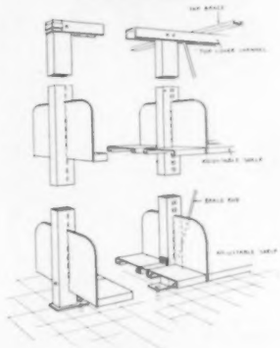
The TOP-BRACED bookstack is recommended for locations where it is undesirable to use floor fastenings. Top bracing makes floor fastening unnecessary.

ART METAL EQUIPMENT FOR LIBRARIES INCLUDES

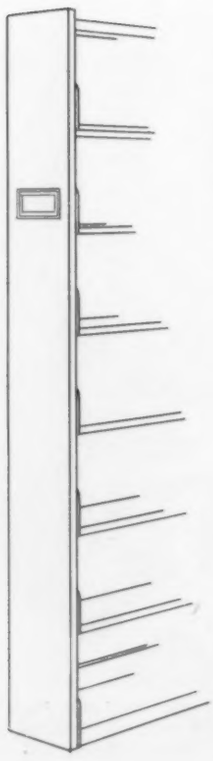
- Standard Type Book Stacks
- Bracket Type Book Stacks
- Bracket Type Rolling Book Stack
- Charging Desks
- Vertical Files
- Stairs and Railings
- Booklifts
- Card Catalog Files
- Reading Tables
- Magazine Racks
- Book Trucks

FREE-STANDING UNIT —DOUBLE-FACED
Each double-faced section contains 2 closed base shelves 10″ deep, center dimension; 12 shelves adjustable 1″ on centers 8″ deep, center dimensions; stack 90″ high overall. Each unit must be securely fastened to floor

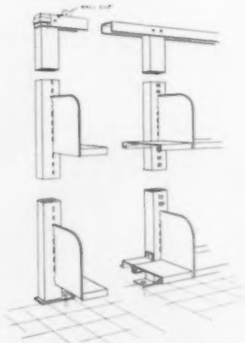
CONSTRUCTION DETAILS



FREE-STANDING UNIT—SINGLE-FACED
Each single-faced section contains 7 shelves adjustable 1″ on centers, stack 90″ high o.a., 8″ deep, center dimension. Fasten securely to floor



TOP-BRACED STACK—DOUBLE-FACED
Each double-faced section contains 14 shelves adjustable 1″ on centers; stack 90″ high o.a., 8″ deep, center dimension



TOP-BRACED UNIT—SINGLE-FACED
Each single-faced section contains 7 shelves adjustable 1″ on centers; stack 90″ high o.a., 8″ deep, center dimensions

1880

YAWMAN AND ERBE MFG. CO.

1940

Executive Offices and Factories: Rochester, N. Y.

BRANCHES OR DEALERS EVERYWHERE

**Steel Desks and Files, Safes,
Storage Cupboards and Shelving
Bank, Hospital and School Equipment
Filing Methods and Supplies
Visible Card Record Equipment**

**Cards, Card Guides,
Vertical Filing Guides and Folders,
Red Rope Pockets and Wallets,
Visible Card Record Systems**

"FOREMOST FOR SIXTY YEARS"

FULL SIZE CLASS ROOM EQUIPMENT FOR TEACHING INDEXING AND FILING

**Steel File
Complete outfit for 40 period Course**

High Schools, Junior Colleges and Private Commercial Schools are paying much attention to the teaching of Indexing and Filing. Teaching this subject is much the same as teaching Typing or the use of Accounting Machines. The student must actually use the files. The method of teaching the care of records, without the records themselves and equipment for arranging and housing them, is just as absurd as it is to think of teaching Typewriting without the aid of a typewriter or Machine Bookkeeping without the aid of a machine.

The Study of Indexing (Classification) and Filing (Orderly Arrangement) is highly educational and not mechanical. Commercial Laboratory Courses are crowded to various degrees. Hence it is necessary to arrange courses of various lengths. The chart to the right lists the complete teaching program, showing what subjects can be adequately covered in courses ranging from 20 to 80 forty-five minute classroom periods.

Program of Subjects for Courses of Various Lengths	Number of Periods Assigned to Each Subject for Various Length Courses			
	20	40	60	80
Introduction	1	1	1	1
Gen. Rules for Alphabetic Indexing	3	3	4	5
Historical Development of Filing Methods	1	1	1	2
Indexing and Filing Routine	3	3	4	5
Correspondence Filing System Supplies	2	2	3	4
Alphabetic Indexing and Filing.	3	5	5	5 Test
Alphabetic Correspondence Filing Systems	3	5 Test	6 Test	7
Duplex Name Alphabetic Indexing		2	3	4
Numeric Correspondence Filing.		4	4	5
Filing Special Records		1	2	4 Test
Geographic Correspondence Filing		4	4	5
Subject or Data Filing			4	5
Charge Systems	1	2	3	4
Follow-Up Systems	1	2	2 Test	3
Transfer Methods	1	1	2	3 Test
Planning Card Record Systems.		1	2	2
Development of Card Indexes.			2	3
Typical Card Record Systems.			1	2
Modern Filing Equipment		1	1	3
Special Equipment, Accessories.			2	2
The Central File Department			1	2
Test	Test	Test	Test	Test
	20	40	60	80

Send for sample pages, instructors guide and complete information on courses for instructors and certificates for students finishing any course.

ADMINISTRATIVE STEEL EQUIPMENT

STYLE-MASTER STEEL DESKS

School administrative offices and classrooms are no exception to evidencing the modern trend in office desks and accessories. The "Y and E" Style-Master steel Desks with 85 models to choose from offer the very latest in design and finish and efficiency. The new Neutratone Gray finish is outstanding in appearance and eye comfort.

VISUALIZED RECORDS

School records, like all important business records, should be kept in such a way as to show at a glance important summaries. The "Y and E" Visible Card Cabinets and book-type files are ideal for small or large school indexes. Write for complete information.

STEEL COUNTER FILES

Bring the records at the point of contact—save valuable space, time and expense. Send for complete information.

ALL-STEEL-EQUIP COMPANY, INC.

740 Griffith Ave. Aurora, Illinois

New York, N. Y., 56-58 W. 22nd St. Chicago, Ill., 326 S. Jefferson St.

BRANCHES AND SALES OFFICES IN PRINCIPAL CITIES — Detroit, Mich., 604 Donovan Bldg.

WRITE FOR LATEST CATALOG OF SCHOOL EQUIPMENT

A-S-E MODERN LOCKERS

All-Steel-Equip Lockers for 1940 have the smoothness, strength and simplicity of design characteristic of better, more durable lockers. Their rugged construction affords extra years of service. Utility is provided at no sacrifice of beauty. Top-flight locker performance is assured by many design and construction features. For example: the distinctive one-piece handle—finished in Satin Chrome—is tamperproof, will not become loosened and incorporates an unobtrusive padlock strike that keeps the padlock from marring finish of door front. Hinge construction is smooth in appearance, jimmy-proof, non-sagging in operation.

A-S-E lockers are available in single tier, double tier, box and combination models—for all storage needs. Finished in Olive Green baked-on enamel, French Gray, School Furniture Brown. Other colors to order.

Send for Catalog No. C-31 for complete information.

A-S-E FILING CABINETS

There is a practical, economical A-S-E File for every filing need—numerous drawer arrangements and sizes to meet each individual requirement—and prices to fit every budget.

In A-S-E **Balanced Design** Filing Equipment every feature is on a quality par with every other construction detail. There are no hidden weak spots that often crop out to give locker operation troubles. A-S-E Aurora Files contain many **plus** values: FULL 28" DEPTH, durable baked-on enamel finish in grained wood or flat colors; heavy six-post steel frame; smooth drawer operation; side-locking compressor, dust-proof enclosed bottom, solid bronze hardware. Write for full information. Catalog F-10.

A-S-E STEEL DESKS

A-S-E Aurora desks, tables and stands are built of the highest grade furniture steel. There are now two sturdily built, exceptionally attractive lines.

The new **DIPLOMAT** line is of strikingly modern design, available in Light Tan, Gunmetal, Olive Green or Black. Walnut, Mahogany or Bleached Walnut finishes at moderate extra cost. Rich looking black linoleum tops—pontoon bases, black trimmed with satin finish, stainless steel bands. The **STANDARD** line is of the attractive, conventional 4-leg design. Made in Olive Green or beautiful grained Walnut or Mahogany finishes. Green linoleum top. Proved construction principles assure extra strength and stability. A-S-E Aurora Desks provide maximum comfort and convenience for the user; and are widely known for workmanship, appearance and durability. Complete details can be obtained by writing for the new illustrated Catalog D-11.

A-S-E TEACHER-CONTROL WALL-ROBES

A-S-E, **and only A-S-E,** offers a steel group wardrobe that is properly designed for **primary** grade rooms. It provides top shelf accessibility for even the smallest children. The Wall-Robe is furnished 54" low for elementary schools, 60" high Wall-Robes are available for the middle and upper grades.

There is individual door operation, but locking is controlled by one master lock in the end unit. Teacher's and storage units are included. The installation is economical—may be recessed in wall in new buildings or placed in front of wall in existing ones. Complete information is included in the A-S-E Wall-Robe Catalog. Send for it today—ask for Bulletin No. WR-3.

A-S-E STEEL CABINETS

A line of fifty-seven models of strong steel cabinets with single or double doors, adjustable shelves, grooved key disc tumbler lock, smart vault type hardware, offers a unit for any particular school need. Standard finish is Olive Green, but Walnut, Mahogany, grained Oak or French Gray may be furnished upon specification. Ask for Catalog No. 177.

A-S-E PATRICIAN SHELVING

Beautifully finished steel bookshelving. Shelves quickly adjustable without use of tools. 36" wide sections may be used as single units or in batteries. Easily erected, easily moved.

BEHIND THE A-S-E TRADE-MARK

The design and manufacture of A-S-E steel lockers, steel book shelving, steel storage, filing, card, wardrobe cabinets, steel transfer cases, steel desks, tables, typewriter stands and steel shop equipment reflect the experience of over a quarter of a century. High quality is maintained and complete satisfaction is assured.

The services of a staff of experienced engineers are available, without obligation, for consulting and designing. Their suggestions have been especially valuable in connection with the choice of the proper type of locker to meet each requirement and in suggesting the most practical solution to the placement problem. Branch offices provide prompt and accurate supervision.

BERGER MANUFACTURING DIVISION

OFFICES IN PRINCIPAL CITIES
Baltimore, Birmingham, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Columbus, Dallas, Detroit

REPUBLIC STEEL CORPORATION

Canton, Ohio

OFFICES IN PRINCIPAL CITIES
Indianapolis, Kansas City, Los Angeles, Minneapolis, New York, Philadelphia, Pittsburgh, San Francisco, St. Louis, Toledo

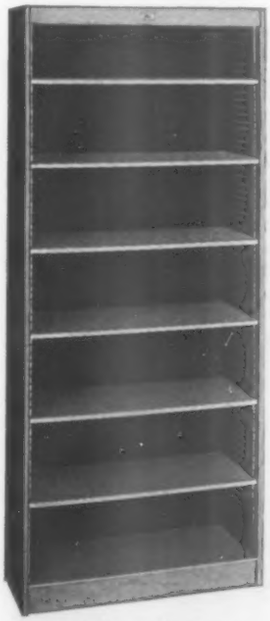
STEEL LOCKERS—ALL TYPES
STORAGE CABINETS
FILING CABINETS
DESKS AND TABLES
STEEL SHELVING
LIBRARY EQUIPMENT
BOOK SHELF UNITS
WARDROBES

Complete Line of Filing Cabinets

BERLOY STEEL EQUIPMENT is manufactured by an organization with more than fifty years' experience in making equipment for the modern school and university. Berloy equipment is built to meet the most rigid requirements for durability, utility, and structural perfection. All items are quickly available in practically every size and type. Experienced Berloy engineers will be sent anywhere without charge to assist architects, builders or purchasing agents in planning new installations.

Teacher's Cabinet and Storage Cabinet

Steel Lockers All Types



Steel Book Shelf Units and Library Stacks

Steel Desks and Tables

Reg. U. S. Pat. Off.
BERLOY

Steel Shelving Many Styles and Sizes

DURABILT STEEL LOCKER CO.

529 Arnold Avenue, Aurora, Ill.

SALES OFFICES IN ALL PRINCIPAL CITIES

PRODUCTS

Steel Lockers for all purposes
Steel Storage and Wardrobe Cabinets
Steel Gymnasium Racks and Trucks
Table Tennis Tables and Equipment

LOCKERS

Single Tier Lockers

For clothing storage, the Durabilt Lockers best suited to schools and gymnasiums are the specially equipped full length or Single Tier Lockers either recessed in the walls, on concrete bases, or free standing on legs. Where Single Tier Lockers are not desired, we recommend the use of Double Tier Lockers. Multiple Tier Lockers, or "Box" Lockers are ideally adapted to storage of gym suits, books, sewing materials, etc. Combinations of any of these types, are of course, available.

W. D. H.	Overall Height Including Legs
12x12x60″	66″
12x15x60″	66″
12x18x60″	66″
15x15x60″	66″
15x18x60″	66″
18x21x60″	66″
12x12x72″	78″
12x15x72″	78″
12x18x72″	78″
15x15x72″	78″
15x18x72″	78″
18x18x72″	78″
18x21x72″	78″

Equipment includes hat shelf, one double prong ceiling hook and three or more single prong side hooks, depending on size of locker.

Double Tier Lockers

W. D. H.	Height Overall Including Legs
12x12x30″	66″
12x12x36″	78″
12x15x36″	78″
15x15x36″	78″
12x15x42″	90″
15x15x42″	90″

Coat hooks same as in Single Tier Lockers. Hat Shelf is omitted in Double Tier Lockers.

Multiple Tier Lockers

Lockers High	W. D. H.	Height Overall Including Legs
5	12x12x12″	66″
6	12x12x12″	78″
5	12x15x12″	66″
6	12x15x12″	78″
4	15x15x15″	66″
5	15x15x14⅖″	78″

Hat Shelf and coat hooks are omitted in Multiple Tier (Box) Lockers.

CABINETS

Combination

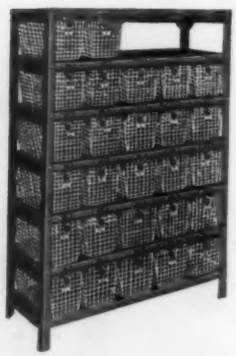
Storage

For secure, dust-proof, fire-retarding, germ-proof, and orderly storage of books, catalogs, stationery, and office supplies; for wardrobe and thousands of other uses, Durabilt steel cabinets are outstanding. Write for prices and complete information.

FEATURES OF CONSTRUCTION

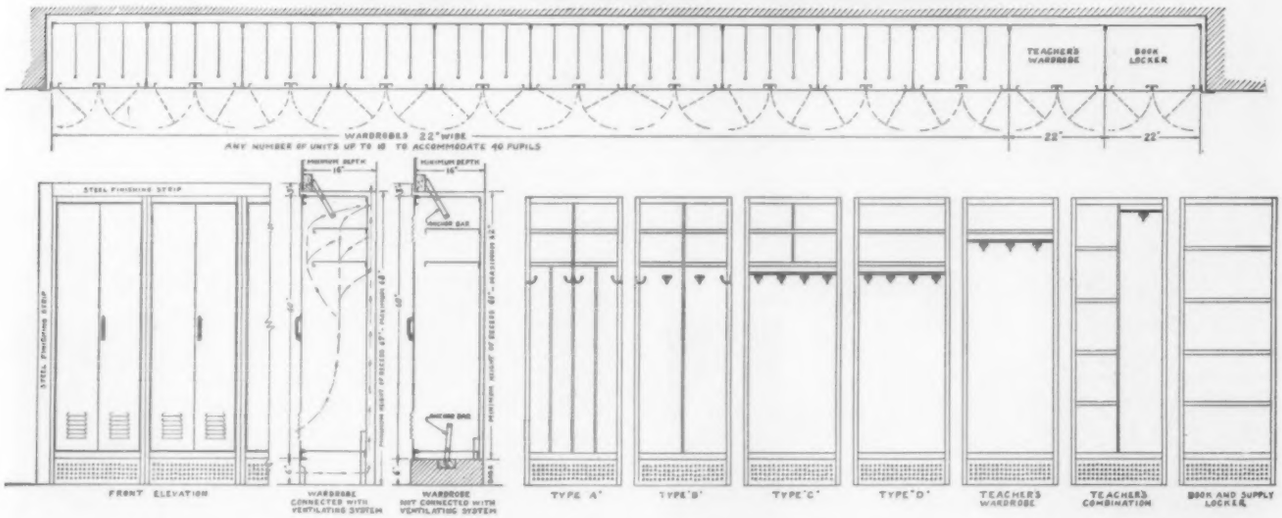
1. More storage space inside than other cabinets of same size.
2. Heavy gauge steel doors, pan reinforced full length.
3. Shelves adjustable up and down on one inch centers without use of tools.
4. Large steel gliders on four corners of bottom make it easy to move cabinet and prevent damage to floor.

BASKET RACKS AND TRUCKS



The use of steel racks and wire baskets is often preferred to Multiple Tier (Box) lockers. This system is less expensive and gives the advantages of complete ventilation and makes the contents visible for inspection at any time. The security and orderly appearance of the box lockers is, of course, sacrificed to some extent. The illustration at the left shows the single row, skeleton type, Basket Rack with baskets in place. This rack has a capacity of 30 baskets and consists of steel shelves with angle uprights, basket separators and padlock hasps which permit locking of the baskets in place. The illustration at the right shows the double row Basket Truck, built with solid ends and casters instead of legs, for portability.

DURABILT SCHOOL WARDROBES



These wardrobes are locked by a unit-control group locking device whereby all units in one entire group may be locked from the master locker. This device will lock or unlock all units across the width of a classroom, and is operated from one end wardrobe or from the teacher's wardrobe. When control lever is in unlocked position, doors on all units open and close independently.

Any one of the following standard interior arrangements may be selected:

(a) Two shelves and three partitions providing four book compartments and four coat compartments in each unit.

(b) Two shelves and one full length partition providing four book compartments and two large coat compartments in each unit.

(c) Two shelves and one short partition providing four book compartments and one large coat compartment with coat rod and hooks.

(d) Two shelves providing two large book compartments and one large coat compartment with coat rod and hooks.

When wardrobes are connected to a ventilating system, doors are louvred at bottom only with shelves and backs round hole perforated. A metal base with ventilation grilles is provided. When wardrobes are not connected with ventilating systems, doors are louvred at top and bottom with shelves, backs, and bases not perforated. Where concrete or terrazzo base is provided, then a metal base is not required because wardrobes rest on 1½-in. bottom frame member.

In connection with the group of Wardrobes in each classroom, install one combination teacher's wardrobe and storage unit preferably 36x15x66 which should be placed at the most convenient end of the room. This unit should have individual lock and may contain the control lever for the group of students' units.

SPECIFICATIONS

Tops, bottoms, sides, backs, shelves and partitions 24 gauge, doors 16 gauge and frame uprights of 1x1x⅛" hard steel angles with cross members of 1½x¾" No. 14 gauge formed steel channels joined to uprights at each end by two 3/16" countersunk rivets.

POPULAR TYPES OF DURABILT STEEL LOCKERS

Two-Person

Two-Person Lockers

W. D. H.*	W. D. H.*
15x12x60"	15x15x72"
15x15x60"	15x18x72"
15x18x60"	15x21x72"
15x12x72"	

Equipment—Consists of two hat shelves, vertical partition dividing lower part into two coat compartments each having one double prong ceiling hook and two or more single prong side hooks, depending on size of locker. Can be furnished without partition when desired.

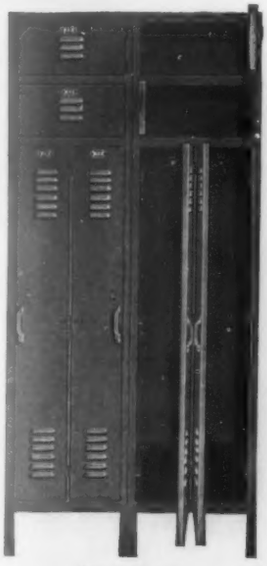
Two-in-one Lockers

W. D. H.*
15x15x72" without coat rod
15x18x72" with coat rod
15x21x72" with coat rod

Coat compartments are 7½" wide x 54" high. Hat compartments are 15" wide x 9" high, making total height of section 72" **exclusive of legs.**

Equipment—One double prong ceiling hook and two or more single prong side hooks, depending on size of locker. Lockers 18 in. deep and over have a coat rod in addition to hook equipment.

* Overall height, including legs, is 6" greater.



Two-in-one

THE GENERAL FIREPROOFING COMPANY

Youngstown, Ohio

BRANCHES
BOSTON—714 Beacon Street
CHICAGO—36 S. State Street
CLEVELAND—1235-37 Prospect Street
HARTFORD—130 Allyn Street
LOS ANGELES—1733-35 So. Los Angeles Street
MINNEAPOLIS—310 N. First Street

BRANCHES
NEWARK—17 Academy Street
NEW YORK—500 Fifth Avenue
PHILADELPHIA—2301 Chestnut Street
PITTSBURGH—642 Grant Street
ST. LOUIS—521-523 Arcade Building
SAN FRANCISCO—1025 Howard Street

WASHINGTON—201 Mills Building

Dealers Elsewhere. Write for Name of One Nearest You

Metal Office, Classroom and Cafeteria Equipment

(FOR METAL LABORATORY EQUIPMENT See Pages 502, 503

RECORD FILING EQUIPMENT

Three, four and five-drawer Super-Filers for all types of records. The drawers of these cabinets have swing fronts that open as the drawer is opened and close as the drawer is closed, thus providing working space without any reduction of the filing capacity. Greater freedom of filing is secured, many of the ordinary operations of filing are mechanized. 18% more capacity, 25% faster filing. Three-drawer letter and cap files are of counter-height, four-drawer are standard height. The five-drawer cabinets give 48% greater capacity on the same floor space. Supplied with and without lock. No. 5404-L letter size unit as shown takes records up to 12¼" x 11$\frac{5}{32}$". No. 5404-C cap-size unit takes records up to 15½" x 11$\frac{5}{32}$".

COMBINATION CARD RECORD AND LETTER OR CAP-SIZE FILE

This file has two card index drawers at the top for 5 x 3 or 6 x 4 cards and three letter-size drawers for miscellaneous filing. Ideal for student records as the card record provides a means for cross reference. Also supplied with cap-size drawers.

CARD INDEX CABINETS FOR 5 x 3, 6 x 4 OR 8 x 5 CARDS

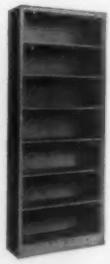
A wide variety of card index cabinets from single drawer units for use on top of a desk to twelve-drawer units as illustrated. Ten, eleven and twelve-drawer units for 5 x 3 cards; eight and nine-drawer units for 6 x 4 cards; seven and eight-drawer units for 8 x 5 cards, all in standard 52-inch height cabinets. Cabinets of counter-height also available.

LOWER-PRICED FILES FOR MISCELLANEOUS FILING

Four-drawer, rigid-front filing cabinets. These cabinets are of the conventional type, having rigid drawer fronts and compressors. Supplied in letter and cap-size, also in bill-size with five-drawers. Cabinets of similar grade also available in counter-height units.

SECTIONAL METAL BOOK CASES

Sectional Steel Book Cases. Strong, rigid inter-locking sections of various depths to accommodate books of varying heights. Sections are fitted with clear glass doors that operate on an equalizing mechanism that positively prevents wedging of doors when moved back into the cabinet. Non-warping construction. Bases and tops to match sections. Finished in oven-baked enamel—olive green or grained effects.



ADJUSTABLE BOOK SHELVING

Adjust-a-Shelf Book Units employ the same type of slotted shelf adjustment as standard library shelving of the larger installations. Units are supplied in 84-inch and 90-inch heights, each unit having a base shelf and six adjustable shelves. Adjustment slots are at one-inch intervals. Any number of units may be assembled together to form complete installations.

LIBRARY SHELVING

A special type of shelving for large libraries. Two types—free-standing and multiple-tier. Illustration shows part of an installation for the University of Minnesota. Engineering and consulting service for architects and building committees.

FIRE-RESISTIVE SAFES FOR VITAL RECORDS

Fire-resistive safes for student's records and college accounts. Highest rating of Underwriters' Laboratories for fire protection. Hundreds of cases of severe exposure and perfect performance of these safes attest their dependability. Interiors assembled from stock filing units to meet requirements.

WRITE FOR LARGE COMPLETE CATALOG OF METAL EQUIPMENT

METAL DESKS AND TABLES

Desks of 66″, 60″, 50″ and 45″ widths for office or instructor's use. Pleasing design, practical utility, durable construction and finish. Last for years minus repairs and refinishing.

Typewriter desks of 60″, 50″ and 45″ widths for business schools, commercial departments, school offices and boards of education. Full complement of drawers for records, supplies and filing.

Metal Tables for classrooms or offices, matching desks in construction and finish. 72″, 66,″, 60″, 50″, 45″ and 36″ widths.

SECRETAIRES

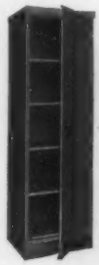
For teachers' records and dormitory rooms. Serves as telephone stand, writing desk, study table. Drawers for manuscript, examination papers, stationery and card records. Space for portable typewriter and pull-out shelf for writing or typing.

STEEL SHELVING FOR SUPPLY STORAGE

Steel Shelving for general supply rooms. Quickly erected or altered to meet any and all conditions of space or stored materials. Skeleton type, semi-enclosed or fully enclosed with doors. Provides systematic and controlled storage of expensive supplies.

STEEL SUPPLY STORAGE CABINETS

Steel Storage Cabinets for classroom or departmental supplies. Adjustable shelves, dust-excluding doors with locks. Combination units for supplies and wardrobe purposes.



Double-door Storage Cabinet with four adjustable shelves. Outside dimensions, 36″ wide, 78″ high and 19½″ or 25½″ deep.

Single-door Storage Cabinet with four adjustable shelves. Outside dimensions, 24″ wide, 78″ high and 19½″ or 25½″ deep.

STEEL WARDROBES

Single and Double-door Wardrobes for teachers. Also may be assembled in batteries for pupils' wraps. Louvred backs for ventilation, hat shelf and coat rod in each cabinet. Doors fitted with automobile type lock handles. Outside dimensions of single door cabinet—24″ wide, 78″ high, and in 19½″ or 25½″ depths. Double door cabinets—36″ wide, 78″ high and 19½″ or 25½″ deep.

ALUMINUM CHAIRS FOR OFFICES, CLASSROOM, CAFETERIAS

Aluminum Swivel Chair for teacher's use. Light in weight and easily moved to and from desk. Durable upholstery. Latest type swivel iron and ball-bearing casters.

Side chair companion to chair shown above. Strong, durable, light-weight aluminum construction.

Swivel chair for superintendent's office. An exceptionally comfortable and well proportioned chair. Made of aluminum. Upholstered in durable material. Light in weight. Ball-bearing casters and latest type swivel iron.

Tablet-arm Aluminum chair for classrooms. Strongly built, welded construction. Very portable and easily moved to facilitate sweeping operations.

Also special chairs and tables for cafeterias.

WRITE FOR LARGE COMPLETE CATALOG OF METAL EQUIPMENT

THE GLOBE-WERNICKE CO.

Cincinnati, Ohio

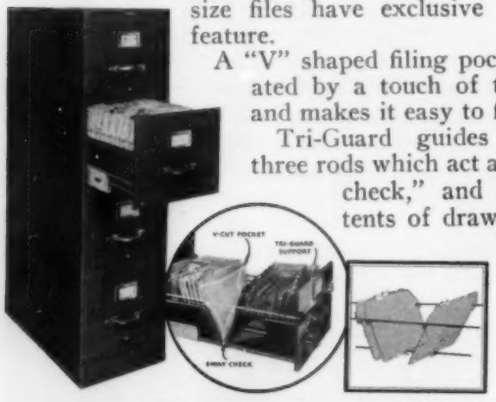
LET US RECOMMEND OFFICE AND LIBRARY EQUIPMENT THAT INCREASES EFFICIENCY AND MAKES WORK EASIER

Modern Globe-Wernicke equipment and systems for schools, libraries and offices enable people to accomplish more work with less effort, keep office routine operating smoothly, increase efficiency and economy.

For more than fifty years the products of this company have been famous for their dependable quality and fine craftsmanship. Our resources and many years' experience are at your service.

FILING CABINETS

There is a G/W steel or wood file for every business need and price range. Standard inserts may also be had including document file, double box drawer and card index drawer.



Better grades of letter and legal size files have exclusive Tri-Guard feature.

A "V" shaped filing pocket is created by a touch of the fingers and makes it easy to file or find.

Tri-Guard guides slide on three rods which act as a "sway-check," and keep contents of drawer upright without compression.

STEEL DESKS AND TABLES

Many exclusive features of construction and design make G/W steel desks and tables very desirable for office and school use. These fine steel desks represent highest standards of quality and combine efficiency, distinctive appearance, durability and long, useful service. They are made in styles and sizes for every office requirement.

BOOKCASES

Globe - Wernicke sectional bookcases are available in several distinctive designs and standard finishes for school, home and office. They combine attractive appearance, convenience, efficiency and economy. Unit includes top, base and book sections of four different heights. More sections are easily added when needed . . . made of wood or steel.

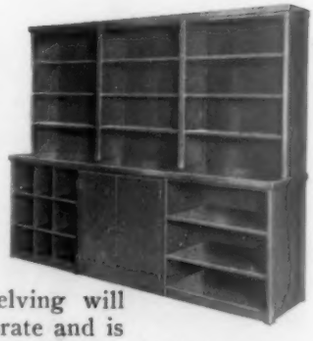
HORIZONTAL SECTIONS

There are numerous kinds of Globe-Wernicke stock steel horizontal filing sections and units may be combined to fit individual requirements. These horizontal sections are light in weight, strong, and easy to intermember or rearrange. There are two standard depths and widths: 17″ and 25″ deep and 33″ and 16½″ wide.

STORAGE CABINETS

Globe-Wernicke steel storage and wardrobe cabinets are made in two grades with a variety of styles and sizes to fit the floor space available and for many storage needs. Contents are kept clean and quickly accessible, losses prevented and privacy assured. They are fire resistant and practically dust-proof.

STEEL SHELVING



G/W steel shelving provides economical storage service for a business lifetime. It is easy to install and can be adapted to the floor space available. Additional units may be obtained for expansion and shelving can be taken down and reset with 100% salvage. Steel shelving will not burn, does not deteriorate and is widely used in schools and public institutions.

ANGULAR CELLULOID TAB GUIDES

Tabs are set at an angle of 45°. These index tabs look you straight in the eye—they are easy to read, easy to find. There is no stooping nor bending and pushing contents about in order to read labels. G/W angular celluloid tab guides and folders save work, prevent filing fatigue, reduce wear and tear, speed up filing and finding. Inserts are removable, making possible unlimited expansion.

OFFICE ACCESSORIES

There are many dependable G/W business accessories which speed up routine, increase efficiency and make work easier . . . needed in every office.

"ACCESSO" WOOD DESK TRAYS

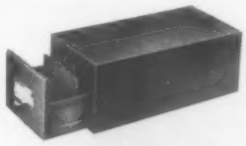
Wide hand openings on all four sides and bottom make it very easy to handle papers.

EVERYDAY FILES

Handy, inexpensive . . . made in 11 styles of indexing. Available in standard and legal sizes.

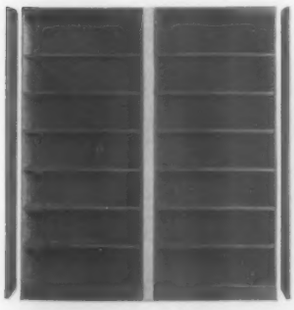
WASTE BASKETS

Attractive . . . rounded corners . . . easy to keep clean . . . with or without legs . . . two sizes.



STEEL CARD INDEX CABINETS

Provide an economical method for keeping records . . . one and two drawer sizes . . . for 3 x 5″, 4 x 6″ and 5 x 8″ cards.

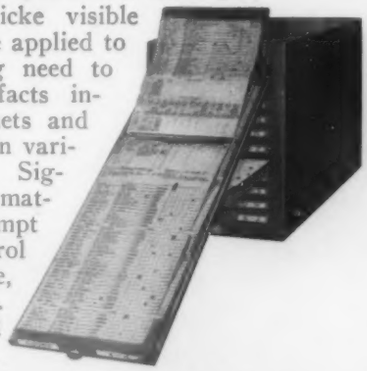


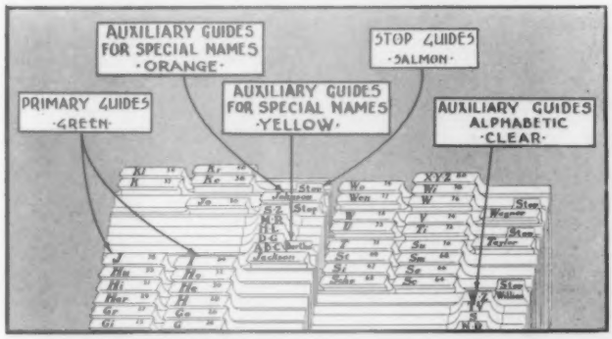
STEEL SLOTTED TYPE BOOK SHELVING

Slotted type book shelf units offer an economical, space-saving method for housing books. Removable end panels permit expansion. Extra units may be added as desired. Units are regularly furnished with six shelves, adjustable every half inch.

VISIBLE RECORD EQUIPMENT

The Globe-Wernicke visible record system can be applied to every record-keeping need to provide important facts instantly. Both cabinets and books are available in various styles and sizes. Signals call attention to matters that require prompt attention. This control system saves time, work and money. Forms are provided for any type of record.




AUXILIARY GUIDES FOR SPECIAL NAMES ·ORANGE·
STOP GUIDES ·SALMON·
PRIMARY GUIDES ·GREEN·
AUXILIARY GUIDES FOR SPECIAL NAMES ·YELLOW·
AUXILIARY GUIDES ALPHABETIC ·CLEAR·

CARD INDEX SUPPLIES

When selecting cards and guides, consider the purpose for which they will be used to get best results. Globe-Wernicke offers a wide range of card index supplies in various grades, including stock and special printed forms for almost every record need. Above is illustrated the Safeguard filing plan—the simplest and best method of filing . . . for card or letter files.

WOOD LIBRARY EQUIPMENT

If you are planning additions to your school or library equipment, let us help solve your problems.

Globe-Wernicke products include filing cabinets and supplies, steel desks and tables, storage cabinets, bookcases, steel shelving, visible record equipment, office accessories, partitions, stock and special equipment for schools, libraries and public institutions. Write to us for more information.

METAL OFFICE FURNITURE COMPANY

Grand Rapids, Michigan

FACTORIES IN Grand Rapids Michigan

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DEALERS IN ALL PRINCIPAL CITIES

STEELCASE *Business Equipment*

TERRELL STEEL LOCKERS

4 ADDED ADVANTAGES AT NO EXTRA COST

Adaptability

A complete range of sizes and styles meets every need of school or gymnasium. Any grouping of full-height, double-tier or box lockers can be supplied.

Safety Handle

All fastening points are concealed in handle. Pilfer-proof, since handle cannot be pried off. Padlock eye is also concealed in handle.

Latching Bar

No meddling possible because it is enclosed and protected between return flange on door and a formed channel. This channel adds strength to the door.

Pre-Locking Device

Positive in operation, pick-proof, simple in design. Two working parts. When door is opened, padlock may be replaced and locked, or key turned, then when door is closed it is automatically locked.

Silenced Operation

Soft molded rubber bumpers are securely riveted and tenoned into door jambs. Similar bumpers silence latching bars. This eliminates noise.

Sturdiness

Rigid construction, acetylene welded frame corners, angle-type legs which are a part of the locker frame—these and other features add to the strength of Terrell Lockers.

Appearance

Attractive finishes, no weld marks, rust-proof bolts (none on fronts), concealed hinge-pins—these enhance the appearance of Terrell Lockers.

STEEL BOOK STACK UNITS

Here is modern steel book shelving in its best and simplest form—designed and built for the utmost in service for educational institutions.

Easily planned — easily installed—very reasonably priced.

Book Stack Units can serve you as efficiently as they are serving many other leading universities and schools.

SIMPLIFIED, MODERN STEEL BOOK SHELVING

Simplicity

Sold as units, no complicated parts to figure. Intermembering units (of varying widths if required), with duplicating parts omitted, match perfectly in building an assembly.

Sizes

Offered in an assortment of sizes—widths 30″, 36″, 42″—depths 9″, 12″—heights 6′ 6″, 7′ 6″, 8′ 6″.

Capacity

These Book Stacks will accommodate 10% more books than sectional glass door bookcases of the same height. Rounded front posts give maximum shelf width.

Flexibility

A combination of sizes for any space. Shelves adjustable every inch for books of any height. Easily and quickly rearranged.

Strength

The construction of upright posts, tops, bases and shelves insures strength and rigidity in every part. No sagging of shelves even under the heaviest load.

Protection

No rough bolts or raw edges of steel can come in contact with books or hands. Front edge of shelf is triple-flanged for added protection.

Beauty

Designed, built and finished to harmonize with the finest furnishings. The attractive cornice top adds a touch of conservative artistry to each unit.

METAL OFFICE FURNITURE COMPANY

Grand Rapids, Michigan

FACTORIES IN Grand Rapids Michigan

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New York City 437 Eleventh Ave.
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Los Angeles 923 E. Third St.
Seattle 609 Third Ave.

DEALERS IN ALL PRINCIPAL CITIES

STEELCASE *Business Equipment*

DESKS AND TABLES

Four grades of desks and tables are available for every office requirement. Made in a complete range of types and sizes. The moderne, No. 5021, Flat Top Desk, as illustrated, is attractive, efficient, economical and will give a lifetime of service.

SECTIONAL EQUIPMENT

Adaptable to large offices or to small departments or offices where requirements are limited to no more than a single letter file and a card index file. Extreme flexibility of wide and narrow sections permits additions to serve every need.

BOOKCASES

These glass door bookcase sections are substantially constructed units, carefully designed and built. Doors are of disappearing type, dust-proof with equalizing device. Three heights, with top and base, intermember perfectly, permitting easy expansion.

Built-to-Order Equipment

Display and Museum Cases

Write for Details

FILING CABINETS

Steelcase files are made in several grades of construction, in suspension and non-suspension types, in various heights from 5-drawer down to single drawer units, in a drawer arrangement for every purpose, in attractive and substantial finishes.

STORAGE CABINETS

Twenty-one sizes and styles of cupboards and wardrobes provide a stock unit for every storage requirement. They are attractively finished, strong and sturdy in construction and very convenient and adaptable in use.

SHELVING

Three types of steel shelving provide the proper kind for use wherever shelf storage is required, whether in libraries where an attractive appearance is necessary or in store-rooms where heavy loads require reinforced shelves.

SAFES

Steelcase safes are furnished in two grades — a Class "B" and "T-20" Grade for extreme risks where safety and protection of records is most important and a Commercial Grade for less exacting conditions. A full range of sizes.

SECURITY STEEL EQUIPMENT CORPORATION

Avenel, New Jersey

DEALERS IN ALL PRINCIPAL CITIES

Security STEEL

"SUPERIORITY IS INHERENT IN ALL PRODUCTS"

STANDARD AND PLANNED OFFICE EQUIPMENT

FILING EQUIPMENT

7700 Line Files

No. 7701

These files include every improved feature and constructional refinement developed in recent years.

Built with the famous Security Progressive Cradle-Type Suspension, these files will withstand the demands of the heaviest filing requirements.

LOW-PRICED FILES

1700 Line

No. 1701

Where utility plus economy is the prime factor, our "1700 Line" is the answer.

Constructed to high Security requirements, the drawers will not sag, even when fully extended.

Security Files are available in 5 Grades and 5 Heights. Standard finishes are olive green, walnut and mahogany.

LIBRARY EQUIPMENT

SECURITY STEEL Library Shelving has no sharp corners or edges that might harm a binding or injure the hands or clothing of anyone. The sides of the shelves are perfectly flush with the sides of the uprights. In addition, the shelving is **Fire-Resistant** and **Insect - Proof.** Simplicity of construction coupled with beauty of design fit this shelving to be used in the most elaborate libraries. A consultant staff of steel equipment experts is ready to co-operate with architects or building committees.

In addition to the library shelving, the regular steel storage shelving for general supply rooms is available, shelving that can be fitted into practically any space and set up without difficulty.

COUNTER HIGH FILING CABINETS

SECURITY STEEL Counter High Filing Cabinets effectively partition office space for reception of visitors and transaction of business. This equipment effects real economy. It conserves floor space and reduces work by keeping records immediately available. The cabinets can be equipped with individual or continuous tops covered with battleship linoleum bound with bronze binding. Files are equipped with bronze handles and label holders. The arrangement of this type of cabinet is almost unlimited.

STEEL SECTIONAL BOOKCASES

SECURITY STEEL Sectional Bookcases with receding glass doors protect treasured volumes in office or library. Doors will positively not wedge when moved back into cabinet. Bases and tops to match sections. Additional sections may be added any time.

LITERATURE AVAILABLE ON ALL LINES

DESKS AND TABLES

2 LINES—3 DIFFERENT LEG ARRANGEMENTS

PERIOD PRESIDENTIAL LINE

4 Legs

6 Legs

8 Legs

To an already comprehensive line, Security has added another amazing feature—4—6 and 8 leg arrangements. This means that all Security desks are tailor-made insofar as leg arrangement is concerned.

A new constructional feature—"Bridge Construction"—with all the rigidity and strength the term implies, adds to the long list of exclusive Security achievements.

All **Security Steel** desks are built to the rigid specifications of the Federal Specification Board of the Government.

THE NEW STANDARD LINE

The ideal desk for teachers, clerks, etc. The highest grade of commercial desk—available in many styles.

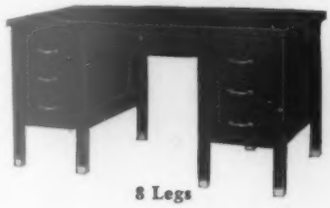
THE PERIOD PRESIDENTIAL LINE

Combining the charm of fine period furniture with the efficiency, economy and endurance of steel—a desk that will lend prestige to any university or school office.

STANDARD LINE

4 Legs

6 Legs



8 Legs

STORAGE CABINETS

For a thousand and one uses. Made in various sizes and styles, including counter and desk heights, to fit individual needs. Provides economical storage for advertising literature, office supplies, stationery, etc., and affords the most satisfactory means of keeping such materials away from dust and dirt.

PLANNED EQUIPMENT

Special SECURITY STEEL installations engineered by Security experts to fit individual needs. Federal, State and Municipal Governments, banks, public utilities, schools, universities and nationally and internationally known business concerns are profiting by Security Planned Equipment Service.

A complete survey of your particular equipment problem or assistance to architects and building committees will be made by our experts with no obligation.

WARDROBE CABINETS

A popular item for teachers. The center partition divides the cabinet into two compartments—one for storage and the other for wardrobe purposes. Complete privacy is assured.

MISCELLANEOUS ACCESSORIES

Many additional items of enduring SECURITY STEEL are available, even though not shown on these two pages. Write for information pertaining to products in which you are interested.

LITERATURE AVAILABLE ON ALL LINES

LYON METAL PRODUCTS INCORPORATED

1334 Madison Ave., Aurora, Illinois

SALES OFFICES IN ALL PRINCIPAL CITIES — CONSULT YOUR CLASSIFIED TELEPHONE DIRECTORY

FACTORIES: Aurora and Chicago Heights, Illinois — PLANTS: Los Angeles, Calif.; New York City, N. Y.

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A representative line of Lyon products required and used in schools is shown on this page. Complete catalogs covering each type of equipment giving specific data available without obligation. Write direct or to our nearest sales office.

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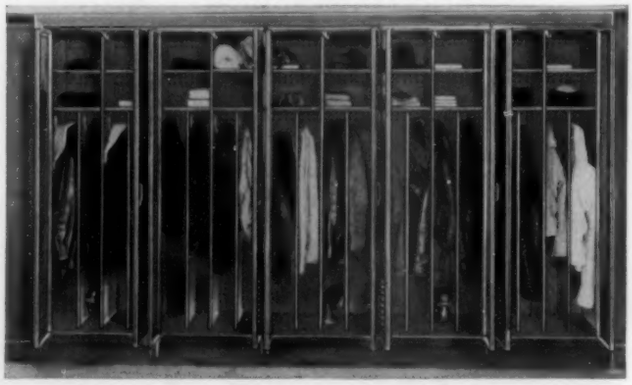
There is a type and size for every storage requirement. Write for Catalog No. 233.



LOCKER WARDROBE

One master locking device gives teacher full control and permits easy supervision of pupils' clothing. Many interior arrangements as may be desired. Write for Catalog No. 243.

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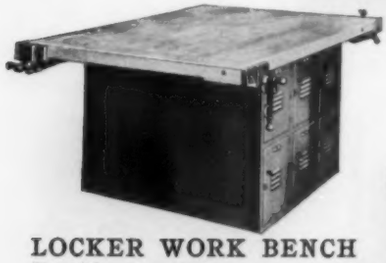
There are seven styles finished in a variety of colors and two-tone color combinations. Accessories include trucks, tablet arms, ganging and thresholding equipment. Write for Catalog No. 835.



LOCKER WORK BENCH

Provides storage space under the bench top—out of the way. Exceptionally rigid and convenient for vocational shop. Write for Catalog No. 233.

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Just one of the many items of Lyon Shop Equipment. Built entirely of steel and available in several sizes. Write for Shop Equipment Catalog No. 331.

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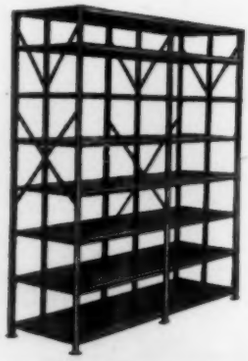

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Write for Shelving Catalog S-7

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NEW! Ediphone Offers 8 Educational Aids

"Ediphone Voice Writing and Integrated Studies"
Covers All Phases of Dictating Equipment Instruction—

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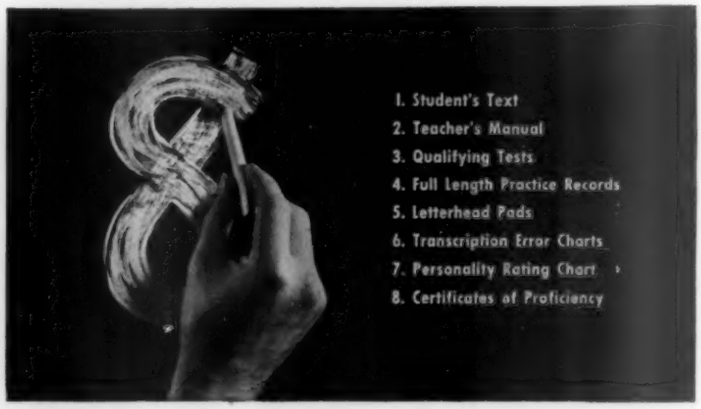

The new training program in Ediphone Voice Writing is a sensation in the commercial training field. ***"Ediphone Voice Writing and Integrated Studies"***, an authoritative student text by South-Western Publishing Company, is keyed to every use of Ediphone Equipment.

The Teacher's Manual—the first ever published—outlines and explains the method and technique to be used. It coordinates the work of students and instructor. The course integrates, for the first time, Ediphone Voice Writing transcription with the study of English, typing, composition and other secretarial subjects.

Completely Authoritative

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Comprehensive Teacher's Manual | Complete Student Text | Full 6" Practice Record

Helps Everybody

It's just the kind of a course that supervisors and teachers have always wanted. It is a compact unit that dovetails perfectly into the curriculum. Your students need it. It gives them the training and practical experience they must have to get jobs quickly. And Mr. Employer is looking for secretaries with this training. Why not get all the facts about these new aids. It's easy now—while the address is before you!

Streamlined Models Introduced to "Team Up" with New Course

Streamlined Secretarial Model

For Secretarial Training

This new beauty makes Ediphone Voice Writing easier than ever before! The cover of the streamlined steel cabinet opens and closes on the roll top desk principle. Fully enclosed. Typease Electric Control—instant start, stop and repeat. New, perfected Re-Creation Reproducer matches the dictator's true voice. Built-in letter compartment opens and closes automatically. Chromium trim. Concealed ball-bearing casters. Floor area only 11″x 13″.

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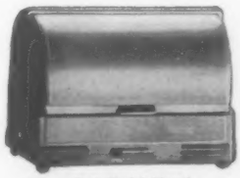
The handsome Streamlined Executive Ediphone (similar to instrument at left) occupies only one square foot of floor space—transforms your office into a modern room. Makes your work much easier.

Streamlined Model Closed

An 8½″x 11″ Miracle!

Executive Desk Model



Desk Model Closed

Secretarial Desk Model

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A beauty to look at! Compact as a box of cigars! This complete Ediphone takes up less space than a regular sheet of 8½″x 11″ business paper. New completely enclosed design—an exclusive feature. Easy to use as the telephone. Finished in warm gray and chromium.

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With a Dictaphone Certificate of Proficiency . . . *plus* the aid of Dictaphone's national employment facilities . . . each student starts on her first position, confident that she can handle it like a seasoned veteran. And her very success is a creditable reflection on the school that trained her so capably.

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The inexpensiveness of recording surfaces makes it possible for students to have daily recording practice periods which are invaluable in speech improvement and remedial reading classes.

The new Dictaphone Educational Telecord has been especially designed for speech and remedial reading classes and is now available in Portable and De Luxe Model Cabinets.

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The Dictaphone Educational Telecord includes a microphone and recording-reproducing playback unit. Faithful reproduction, low cost per recording surface and the simplicity of operation *of this machine have proved invaluable to students and instructors.*

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Modern Dictaphone equipment has found an invaluable place in sight conservation classes. With the Dictaphone Method, the ear supplements, and in many cases supplants, visual study.

WRITE FOR FURTHER INFORMATION ON DICTAPHONE EQUIPMENT AND COURSES!

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UNDERWOOD TYPEWRITERS are available in 11", 12", 14", 18", 20" and 26" carriage widths — a request will bring you full information. THE UNDERWOOD STANDARD TYPEWRITER with AUTOMATIC JUSTIFYING DEVICE, which produces even right hand margins, is on display at all Underwood Elliott Fisher Branch Offices.

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THE NEW UNDERWOOD BUILT-IN TYPING STAND is an ingenious folding tripod steel stand perfected after many years of research. Built right into the Underwood TYPEMASTER Portable carrying case. Supplied exclusively on Underwood Typemaster Portables.

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UNDERWOOD SUNDSTRAND FRONT FEED PORTABLE POSTING MACHINE . . . an all purpose Figuring Machine for addition, subtraction, multiplication, division and the preparation of Statements and Ledgers. Features include automatic cross tabulation, automatic month, automatic non-addition, automatic subtraction, automatic credit balances, automatic non-print. Also many optional features available.

UNDERWOOD ELLIOTT FISHER ACCOUNTING MACHINES . . . an individual model for every accounting need . . . are available at all UEF Branch Offices. For complete information address your inquiry to the Accounting Machine Division, Underwood Elliott Fisher Company, One Park Avenue, New York, N. Y.

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The Ditto Gelatine duplicator is famous for flexibility. It makes up to 100 bright, legible copies direct from your original, without stencil, carbon or type.

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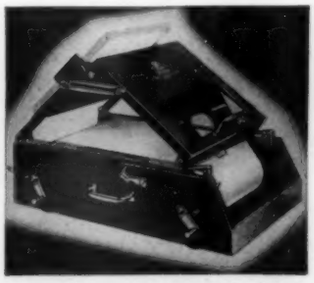
The Ditto R-4 Rotary — A self-feeding, self-ejecting gelatine process machine, which sets a new standard for efficient, economical operation. Operates at a speed of 70 copies per minute. Copying surface—8½ x 14″

Hand Fed Rotary—A hand fed, self-ejecting duplicator that is simple to operate. Strong, lightweight, foolproof. Makes 50 or more copies per minute. Highly efficient—low in cost. Size 8½ x 14″



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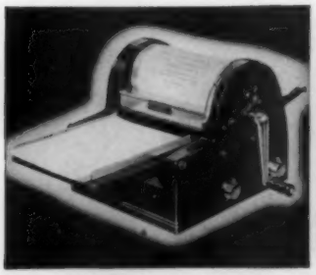
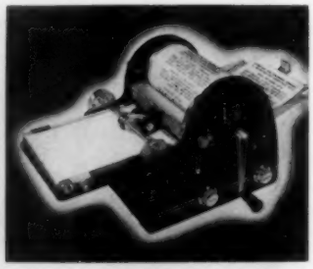


The Ditto D-5 — A sturdy, compact, hand fed duplicator. A table model liquid duplicator designed for school use. Contains many outstanding engineering features. Size 9 x 13¾″



The Ditto D-6 — A speedy liquid process rotary. Self-feeding and self-ejecting. Produces 70 or more copies per minute. Masters may be reused over and over. Copying surface—8½ x 14″

The Ditto direct (liquid process) duplicator produces up to 300 copies and makes possible the repeated use of an original to make additional copies as needed. The copies are made direct from the original.

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THRIFTY Buyers Purchase VUL-COT baskets for Classrooms, Dormitories, Offices, Lavatories, Locker Rooms and Laboratories.

Because of their durability, savings are made on maintenance costs; VUL-COT baskets add attractiveness to any room. And there's a VUL-COT tastefully appropriate in color and shape for every room and use.

As you know, a waste basket takes more of a beating than any other piece of furniture in your school . . . yet here is one that is guaranteed for 5 years. You see, VUL-COT waste baskets are made of hard vulcanized fibre, which means that under ordinary conditions they will last and last attractively for years.

Unlike other types of baskets, VUL-COTS do not crack, dent, split, splinter, rust or corrode. Light in weight, they are easier to handle and to keep clean. They do not mar floors or furniture.

The first VUL-COT shown at right is the ▶ SQUARE TAPER, a smart style popular with executives, and ideal for reception rooms, libraries, or meeting rooms. Choice of Maroon-Brown, Olive-Green or Walnut.

	Square No. 4 Ins.	Square No. 5 Ins.	Square No. 6 Ins.
Top	10½x10½	12x12	14x14
Bottom .	8½x 8½	10x10	12x12
Depth ..	14	14	16

College and school letters in colors done for small extra cost depending on character and color. Simple identification marks . . . . . no charge

Standard for 50 Years

The VUL-COT shown to right is the ROUND TAPER, the most popular shape for general use. These 3 practical sizes available in rich Maroon-Brown, Olive-Green or Walnut. Round baskets in No. 2 and No. 3 sizes are standard for office and schoolroom use. The Round Taper, just like all VUL-COT waste baskets, is guaranteed for five years. ◀

	Round No. 1 Ins.	Round No. 2 Ins.	Round No. 3 Ins.
Top diameter	10	12	14
Bottom diameter	8	10	12
Depth	12	14	16

◀ The tall basket in center at left is the ROUND STRAIGHT, a utility basket admirably suited for use in washrooms, basements, auditoriums, halls and locker rooms. Standard colors: Maroon-Brown, Olive-Green, or Walnut.

	Round Straight No. 9 Ins.	Round Straight No. 10 Ins.
Diameter	14	14
Depth	20	30

◀ Just to left is the OVAL TAPER. This popular shape which comes in standard colors, is very practical for use where space is limited.

	Oval No. 11 Ins.	Oval No. 12 Ins.
Top dia.	8½x10½	13x10½
Bottom dia. ..	6½x 9	11x 8½
Depth	12	14

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Write for special school discount price schedule to

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Wilmington, Delaware

GUARANTEE

This Vul-Cot *waste basket with ordinary usage should last a lifetime. It is absolutely guaranteed as to material and workmanship for a period of five years from date of purchase, when used only as a waste basket. If during that time in such service it proves defective, return and a new basket will be supplied.*

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SECTION IX
CAFETERIA—HOME ECONOMICS—DORMITORY

THE DESIGNING OF COLLEGE DORMITORIES

By HOWARD DWIGHT SMITH

University Architect, Ohio State University

COLLEGE officials who have been through the experiences of planning, building and operating student dormitories would probably classify in a variety of ways the problems that have confronted them. Likewise, their architects would suggest numerous points of view from which the problems involved have been studied. Basing my conclusions principally upon recent experiences in the medium-cost dormitory field at Ohio State University, I believe that the problems involved may be classified under three principal headings typical of dormitories throughout the country: (1) problems relating to administration of the dormitory as an institution; (2) problems of planning and of construction; and (3) problems involving esthetic considerations. These may be considered of different relative importance by the dormitory administrator, the college fiscal officer and the architect, but it may be contended with some merit that best solutions will result from critical analysis of the problems by all three of the agencies mentioned.

Three Cooperative Points of View

Problems of administration, construction and esthetics are interwoven, and their solution must not be sought separately, regardless of their relative importance. Cooperation between administrator and architect is of prime importance, particularly in the preparation of the "program," or statement of the fundamental objectives and requirements of a specific project. It is particularly desirable that the architect discipline himself to see the problems of the administrator from the administrator's point of view, and so far as possible to make his technical and artistic training available to the administrator. Except where institutions have had no experience in dormitory administration and an architect of known experience and ability in the dormitory field is retained, the complete solution of dormitory problems should not be left to the architect alone, even though he may logically be depended upon as an arbiter of ideas and generally the judge of the relative merit of final solutions.

Cost as a Yardstick

Considerations of economy generally influence the solutions of most dormitory problems in all three of the classifications referred to. Just as the student budget determines whether the student must move in the "low-cost" educational area, where tuition is subsidized and where subsistence must be kept on the lowest possible financial basis, or whether he may participate in an average program of a partially endowed institution with average living standards, or whether he may enjoy the luxury of a highly specialized and expensive educational and living program, just so the building budget divides dormitories into low-cost, medium-cost and high-cost housing.

In approaching new dormitory problems and listing examples of existing dormitories for study, administrators and architects are most likely to ask, "What is the 'per-occupant' cost?" even before they ask the more logical question, "Does the dormitory serve its purpose satisfactorily?" The "per-occupant" cost may therefore be considered as a yardstick, at least in general appraisals. Examples of all three cost types are referred to here. Ohio Stadium-Dormitories, a barracks type, costing approximately $650 per occupant (including proportionate cost of the original seating structure) is used as an example of low-cost housing. The new Men's Cottages at Madison, Wis., and the Men's Dormitory at Bowling Green (Ohio) University, costing approximately $1,000 per occupant, are cited as examples in the low-cost field. Of the medium-cost type are the new dormitories for Ohio State University and for Miami University, both for men and for women, ranging in per-occupant construction cost from approximately $1,250 to $2,000. Plans of Calhoun College at Yale are used as a single example of the higher per-occupant cost type.

Size of the Housing Unit

Among the fundamental administrative problems involved in dormitory planning is the size of the housing unit, or the family. To maintain domestic scale and an intimate social atmosphere, it is desirable to keep the unit comparatively small. In undergraduate dormitories where proctorships exist and where systems of tutoring and self-government are maintained, small family units are also desirable. The per-occupant cost, however, of maintaining housekeeping and management services, such as may be expected in apartment houses or hotels, increases as the size of units decreases. While it may be desirable, for good educational results, to have undergraduates assigned in groups of eight or ten under a single proctor or tutor, the furnishing of separate living, study and dining quarters for such small units can hardly be considered in medium-cost accommodations. Centralized service for larger groups, which affords the economies of so-called "mass production," is necessary in the low-cost and medium-cost fields. Provision for continuous responsible control of entrances, protection of property, distribution of mail and packages, reception and entertainment of guests, and in some cases receipt and disbursement of funds and the keeping of accounts, should be maintained for each group.

This service can be maintained for groups of a hundred or more as economically as for smaller groups in isolated apartments. The concentration of this kind of service at some point where other administrative personnel is necessary for business administration, accounts, telephone exchange service, and the like, is a justifiable economy. Carefully planned architectural setting and reasonably ingenious administration should result in handling large-scale operations of this kind with a minimum of institutional atmosphere.

Accommodations for the reception of guests of either sex, incidentally or at social functions, should be provided. This is as important in the modern men's dormitory as it is in a women's dormitory. If the entrance and reception of guests may be directed with friendliness and cordiality from the same central point of control mentioned above, so much the better for good administration and economy. No small problem is presented in providing proper and adequate coat and toilet facilities for these guests without encroaching upon the facilities which must be maintained for regular dormitory occupants.

It will be noted by referring to the first floor plan of the Men's Dormitory of Ohio State University that administrative control can be maintained at a lobby desk from the central point of which there is direct observation of two outside entrances, the entrances to the guest lounge, the guest coat room, the game room, and the main stairs, the telephone alcove, the post office boxes, a package alcove, a main dining room and a guest-room corridor. Behind or adjacent to this desk is a general supply showcase and counter, a telephone central, the accounting department and

COST DATA, MEN'S DORMITORY, OHIO STATE UNIVERSITY

Construction contracts awarded ..... March, 1938
Construction completion date ..... May 15, 1940
Occupancy date ..... September 15, 1940
Number of occupants 550
Size of building in cubic feet ..... 1,461,000 cu. ft.

Item	*Cost*	*Cost per Occupant*	*Cost per Cubic Foot*	*% of Construction Cost*	*% of Total Project Cost*
General construction	$554,800	$1,008.30	38.0¢	82.9%	..
Plumbing	41,500	75.40	02.8¢	6.2%	..
Electric work	25,800	46.80	01.8¢	3.9%	..
Elevators	14,000	25.40	01.0¢	2.1%	..
Heating and ventilating*	32,900	59.80	02.2¢	4.9%	..
Total construction cost	$669,000	$1,215.70	45.8¢	100%	76.5%
Tunnel and utilities*	$ 62,000	$ 112.70	04.2¢		7.1%
Kitchen equipment†	$ 30,000	$ 54.50	02.1¢	..	3.4%
All other furniture and equipment†	60,000	109	04.1¢	..	6.8%
Total equipment	$ 90,000	$ 163.50	06.2¢	..	10.2%
Design and supervision††	$ 39,000	$ 70.80	02.7¢	..	4.5%
Interest during construction†	$ 15,000	$ 27.30	01.0¢	..	1.7%
TOTAL PROJECT COST	$875,000	$1,590.00	59.9¢	..	100%

* Service is provided from University power plant; the tunnel and utilities cost replaces cost of generating heat and power in the dormitory.

† Estimated on reasonably complete data available September, 1939.

†† Computed to include proportion of Civil Service salaries and University Architect's office overhead.

Left—This detailed report is included for this one project which represents a fair average of the buildings discussed in this article

Below—Abbreviations of symbols for all plans reproduced in connection with this article

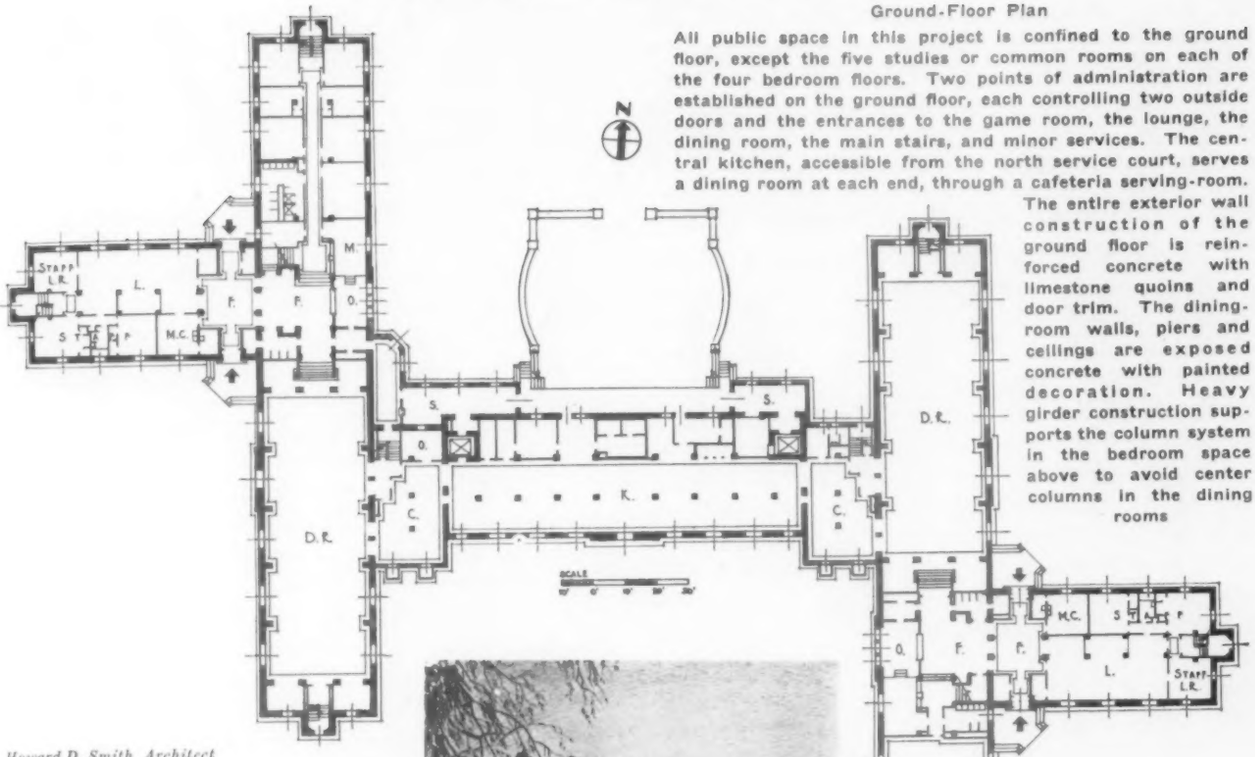
M. C. - Men's Coat Room
O. - Office
P. - Porch
S. - Service
St. - Study
STAFF. - Matron - Supervisor - Proctor or Fellow
S. M. - Smoking Room
S. R. - Sorority Room
W. C. - Women's Coat Room
C. - Cafeteria
D. R. - Dining Room
F. - Foyer
G. R. - Game Room
K. - Kitchen
L. - Lounge
LIB. - Library
L. R. - Living Room
M. - Mail

Rooms with no symbols are bedrooms or bedroom studies, the number of closets indicating whether single or double.

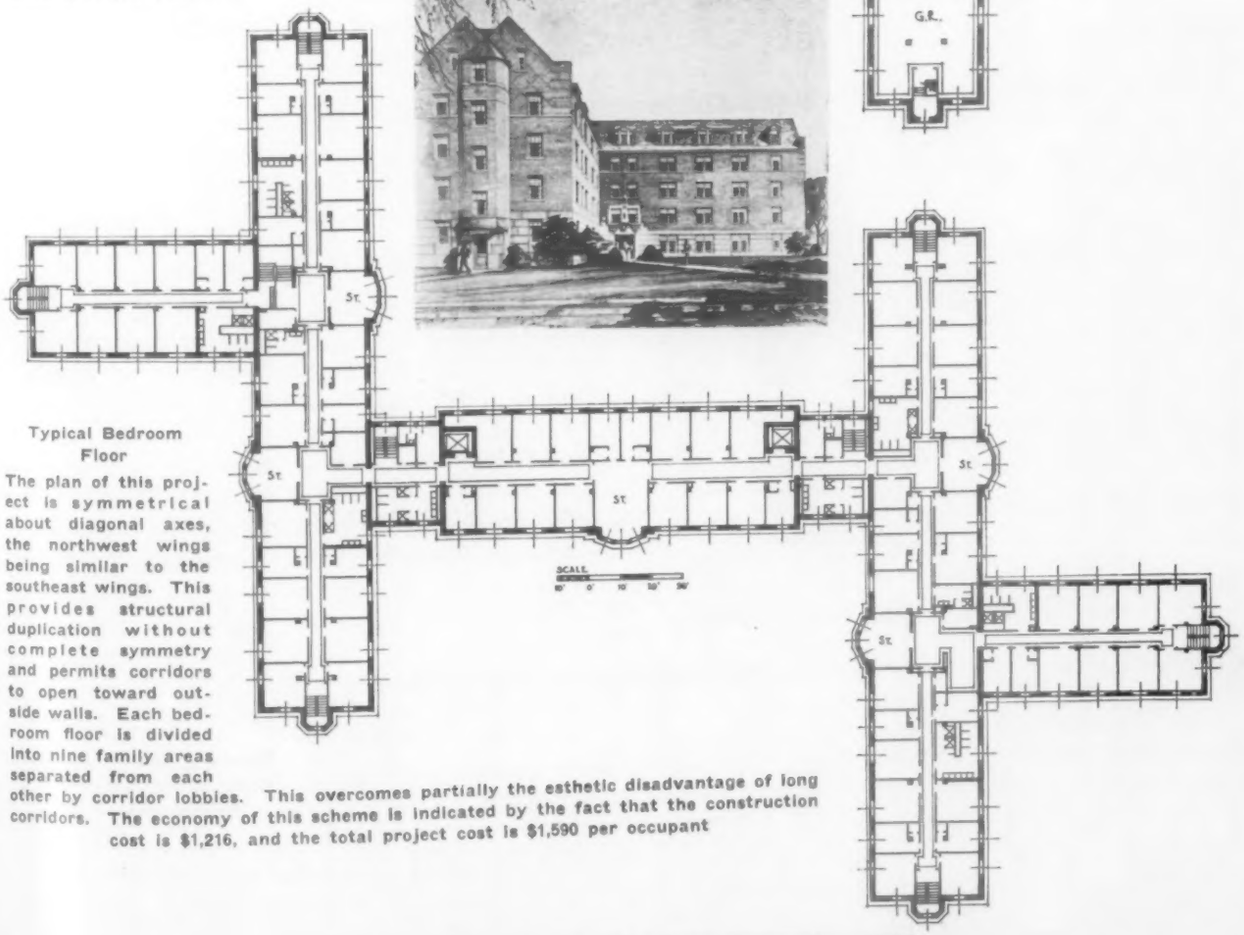
Ground-Floor Plan

All public space in this project is confined to the ground floor, except the five studies or common rooms on each of the four bedroom floors. Two points of administration are established on the ground floor, each controlling two outside doors and the entrances to the game room, the lounge, the dining room, the main stairs, and minor services. The central kitchen, accessible from the north service court, serves a dining room at each end, through a cafeteria serving-room.

The entire exterior wall construction of the ground floor is reinforced concrete with limestone quoins and door trim. The dining-room walls, piers and ceilings are exposed concrete with painted decoration. Heavy girder construction supports the column system in the bedroom space above to avoid center columns in the dining rooms



Howard D. Smith, Architect
Harry F. Reichard, Associate University Architect



Typical Bedroom Floor

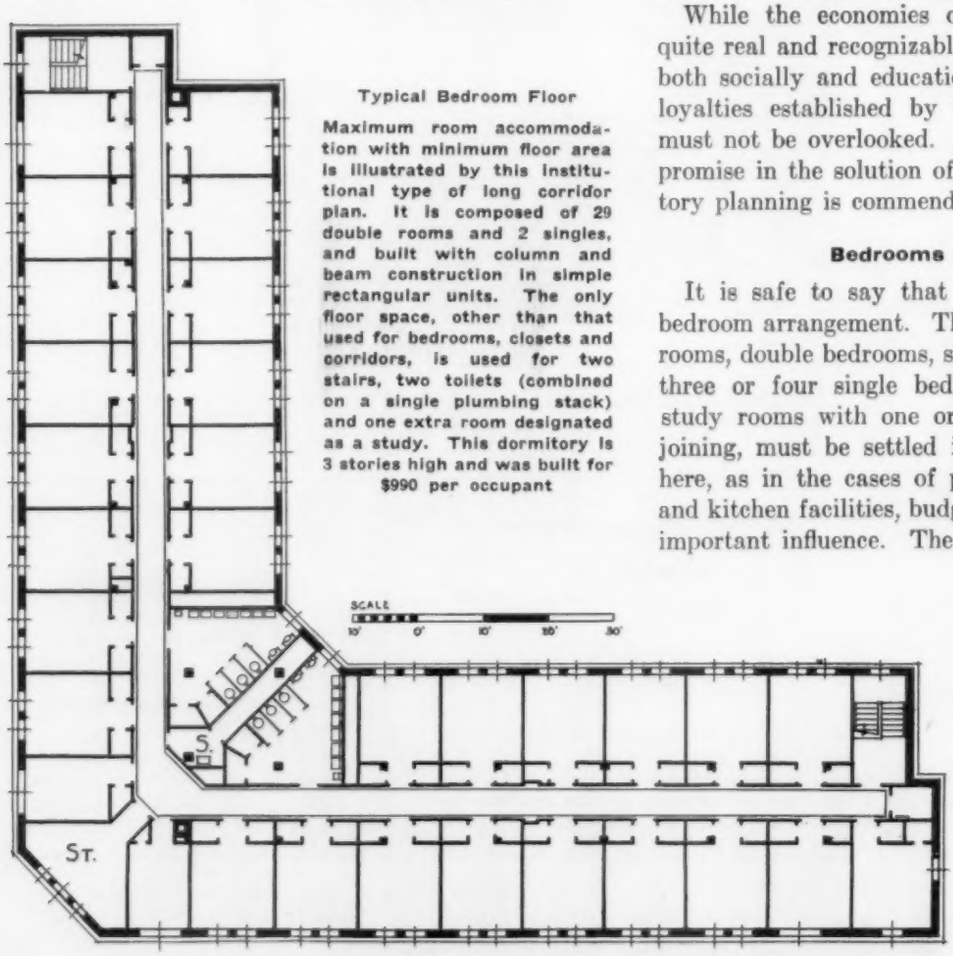
The plan of this project is symmetrical about diagonal axes, the northwest wings being similar to the southeast wings. This provides structural duplication without complete symmetry and permits corridors to open toward outside walls. Each bedroom floor is divided into nine family areas separated from each other by corridor lobbies. This overcomes partially the esthetic disadvantage of long corridors. The economy of this scheme is indicated by the fact that the construction cost is $1,216, and the total project cost is $1,590 per occupant

The Men's Dormitory, Ohio State University—1939

the manager's office. In this particular plan it will be noted, in connection with the reception of guests, that a three-room apartment for staff members adjoins the main lounge, with possible contacts for hostess purposes or for incidental supervision and control by staff members.

Dining Room and Kitchen

The size of dining rooms and kitchens is quite as fundamental as the size of dormitory families. For educational and social purposes, small groups seem a desirable administrative objective. Cafeteria and waiter service may be handled for small isolated groups in medium-cost housing without great added expense only if pantries and storage are centralized for several groups. But the purchase, preparation and control of food with maximum economy must be on a large scale. While individual dining rooms for 30 to 50 may be readily served and administered, with alcoves for groups of smaller numbers, pantry service for 300 to 500 may be maintained with little, or no more, overhead than for the smaller groups. And, furthermore, kitchen service for groups up to 1,000 may be operated much more economically per serving than can the smaller groups, quite as efficiently, and with no lowering of quality of food or service.



Typical Bedroom Floor

Maximum room accommodation with minimum floor area is illustrated by this institutional type of long corridor plan. It is composed of 29 double rooms and 2 singles, and built with column and beam construction in simple rectangular units. The only floor space, other than that used for bedrooms, closets and corridors, is used for two stairs, two toilets (combined on a single plumbing stack) and one extra room designated as a study. This dormitory is 3 stories high and was built for $990 per occupant

Bowling Green (Ohio) State University Men's Dormitory—1937

John P. Schooley, Architect

Attention is called to the dining service at Notre Dame University, South Bend, Ind., where a single kitchen serves efficiently two dining rooms each having a capacity of 1,100, a cafeteria which has 250 seats, and two private banquet rooms accommodating some 200 more.

It is obvious, therefore, that the solution of the dining room-kitchen problem in connection with dormitories may generally depend upon a successful compromise between larger centralized food storage and preparation on the one hand, and the number of dining units which may be efficiently served from such central point on the other hand.

Referring again to the Men's Dormitory at Ohio State, whose bedrooms in its first unit will accommodate 550 occupants, we note a central food storage and preparation area on the ground floor which serves a dining room from each end, through a small cafeteria or serving room. Each of these dining rooms can seat at tables a total of 280. For regular meal service, table waiters will use the cafeterias as serving pantries. For breakfast or buffet service, the cafeterias can be used for self-service. It should be noted that the kitchen area is intended to serve additional dining space when planned additions will provide up to a total of 1,000 seatings.

While the economies of large kitchen areas are quite real and recognizable, the administrative value, both socially and educationally, of the contacts and loyalties established by the smaller dining groups must not be overlooked. Here again ingenious compromise in the solution of this problem in all dormitory planning is commendable.

Bedrooms and Studies

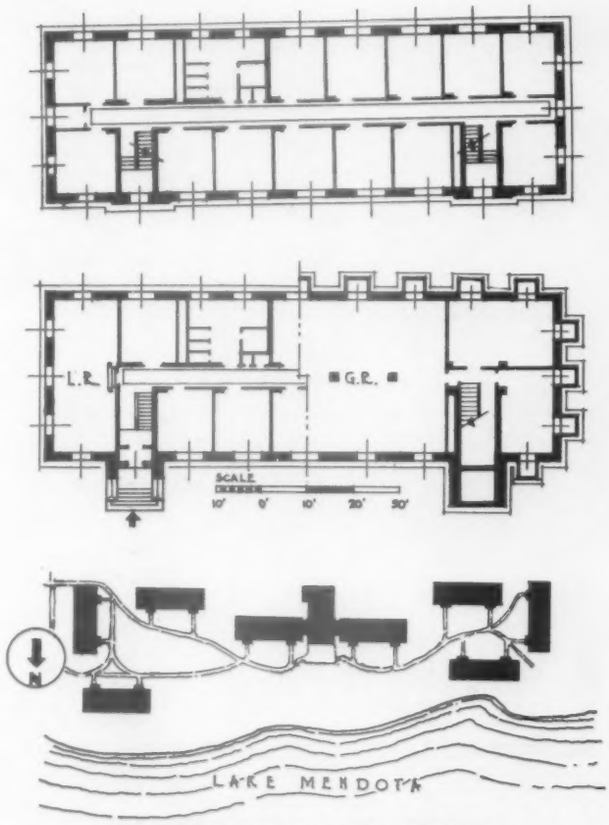
It is safe to say that there is no fixed rule for bedroom arrangement. The issue between single bedrooms, double bedrooms, single study rooms with two, three or four single bedrooms adjoining, or single study rooms with one or two double bedrooms adjoining, must be settled in each specific case. But here, as in the cases of public rooms, dining rooms and kitchen facilities, budget requirements exercise an important influence. The disadvantages of the mul-

tiple use of a bedroom cannot be overlooked. Dissimilarity of study and sleep programs of roommates who are otherwise socially and culturally congenial present problems which influence plans and administration, but which are generally ignored by force of cost consideration. Leaving aside any consideration of the lessons in social cooperation which come from the sharing of the same dormitory space by two or more students, we may assume the desirability of arrangement of space in about the following order: a single bedroom and a separate study for a single occupant; a single room for a single occupant for both sleeping and study; a single study with two single bedrooms for two students; a single study with a double bedroom for two students; a single study with two adjoining double bedrooms for four students; followed by multiple use of barracks or ward type bedrooms with separate group study facilities. It is obvious that this order of preference follows in general the relative amount of space required per occupant, which of course reflects itself in the total size of the building and therefore in the ultimate per-occupant cost.

For purpose of illustration let us refer again to the typical bedroom arrangement in the Ohio State Men's Dormitory. This is based upon the division of each floor into nine corridor groups with separate toilet and stair services. Since there are four bedroom floors, this provides a total of thirty-six so-called "family" units in the total construction. Each of these groups contains both double and single rooms, in the proportion of approximately two to one, the whole project having 225 double rooms and 100 singles. Each group has its own toilet and shower space, the proportion being generally one lavatory for each three men, one closet for six men, one urinal for thirteen men, and one shower for eight men. No bedrooms, except a very limited number in the separate guest corridor on the first mezzanine have individual lavatories.

Since no suites of rooms are provided, that is, no combination of bedrooms and studies, in the Ohio plan, a compromise is noted in the provision of a large study or common room in each of the seven larger groups of rooms on each floor. These are centrally located with reference to the groups and, except in the central family group, are placed at the ends of intersecting corridors, an arrangement which gives cross light and architectural emphasis at the points where long corridors are broken by doors and partitions.

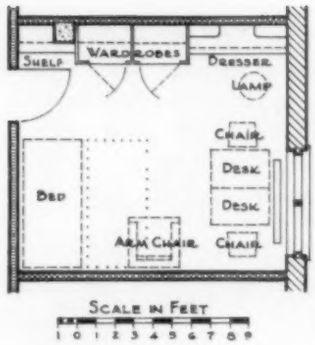
The problem of compliance with building-code requirements for stairs as emergency exits is present in most states. The reason for multiplicity of stairs of course is safety. The requirement in Ohio, as in some other states, is that from the door of every room there shall be two separate means of egress to exterior grade level, and that the stairs shall generally not be more than 150 feet apart. In a large dormitory this usually means a larger number of stairs than it is convenient to control, and the problem of promiscuous and uncontrolled ingress and egress at outlying portions of the building is presented to the administration. In the Ohio plan the placing of exit towers at the end of six main wings, and four interior stairs under control of administrative centers, seems to offer a fair solution. The stair towers provide convenient vertical circulation between the various groups of rooms, and the exit doors at grade level have automatic switches which control signal lights at the central control desks, indicating when these outlying doors are opened.



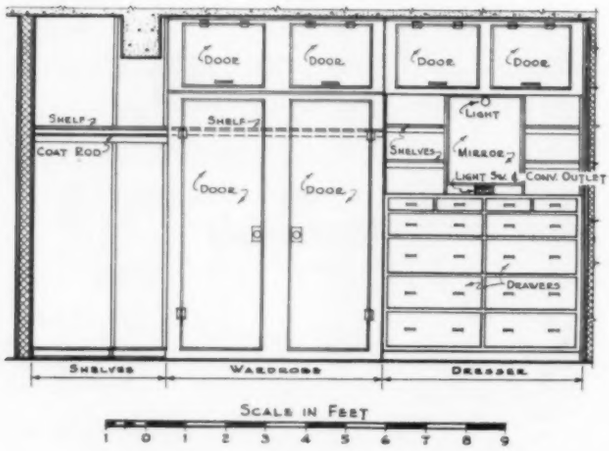
A. F. Gallistel, AIA, Superintendent of Buildings
Roger C. Kirchaff, State Architect

University of Wisconsin
Men's Cottage Dormitories—1938-1939

A group of eight cottages, each accommodating 80 men, with a central administration and dining unit, is located in the wooded area on the south shore of Lake Mendota at Madison. The eight units are identical except for minor variations in grades and entrance levels. Each has three bedroom floors, a living room at one end of the first floor, a large game room in the basement. Exposed masonry walls are used except in the bedrooms. All ceilings are painted concrete slabs, supported on exterior walls and interior beams and columns which are contained within corridor walls. There are no single rooms, and each room has a built-in dresser and wardrobe unit similar to that shown in an adjoining illustration. Exterior-wall material is local tan limestone. The total cost of the project, including the administration unit, furniture and equipment, is less than $1,000 per occupant



Left — This double-bedroom layout is used in the Men's Cottages at the University of Wisconsin and the Men's Dormitory at Ohio State University. The wardrobes and dresser units are built into the room as a part of the general construction contract. The Wisconsin plan uses curtains instead of doors at the wardrobes. Single- or double-deck beds may be used



Detail of built-in wardrobe and dresser, Men's Dormitory, Ohio State University

Furnishings

Furnishing and equipping the individual room is extremely sensitive to budget limitations. In the de luxe dormitories where floor space is not limited by necessity to minimum areas for the indispensable pieces, it is possible to simulate domestic settings and to use a variety of furniture and hangings. But in the medium-cost dormitories where minimum area, minimum pieces and maximum accommodation are required, and where the advantage of quantity buying is an important consideration, it is desirable that an actual sample room be set up and fully furnished in order to give full opportunity to study the finished product from the point of view of the administrator, the designer and the builder. The following may be considered minimum requirements for a double room: two bed spaces of 20 square feet each; one double desk of 13 square feet area; two desk chairs of 2½ square feet each; one easy chair covering 5½ square feet of floor; 7½ square feet of dresser area; 18 square feet of wardrobe and closet area; and 70 to 90 square feet of unencumbered floor area. This tabulation gives approximately 175 square feet gross area for a double room. (The use of double-deck beds or bunks gives a flexibility of 20 square feet in floor area.) The total minimum area of a single room is of course more than half the area of the double room because of certain duplicate use of space in double rooms.

In the Wisconsin cottage scheme an ingenious built-in combination closet, dresser, and bookcase is in use which saves several square feet of space in each room. This has been used in similar fashion at Ohio State in the Men's Dormitory. Not only does it save floor space, but its quantity use in standardized size is undoubtedly a measure of economy. The plan reduces the pieces of movable furniture, but is subject to the criticism of monotony of room treatment. This, however, is a part of the price which inevitably must be paid for keeping total expenditures down to what we have termed medium cost.

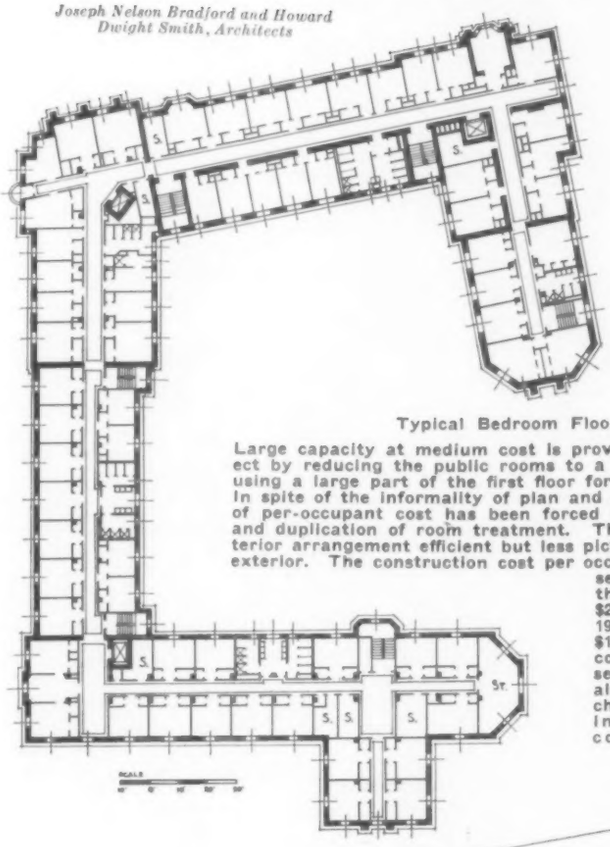
The double-deck bed of inexpensive substantial construction has long been encountered as standard equipment in clubs and fraternities to increase sleeping accommodations. The new cottages at the University of Wisconsin and the new dormitories at Ohio State University are among those adopting the double-deck idea to conserve floor space in rooms occupied by two students. In both these instances the low-slung double-unit type is used so that the beds may serve as two singles as well as in combination. The scheme is most effective, of course, where rooms are designed so that convenient floor space is available for two single beds. Flexibility of arrangement and use of equipment under such circumstances is an obvious advantage, and the interchange of equipment as between single and double rooms presents no administrative disadvantage.

The problem of choice as between metal or wood furniture is one which involves many considerations of design and maintenance, and space hardly permits its discussion here. The increasing use of machine-produced pressed metal equipment cannot be ignored. However, the presence of the long-established carpenter repair shop in the maintenance department of colleges and universities where repair and refinishing is regular procedure presents a lingering advantage in favor of wood furniture which it may take a long time to overcome.

Basic Construction—Floors—Windows

Most of the problems discussed up to this point are largely of administration, or jointly of administration and construction. Some mention might well be made of a few items which have mainly to do with construction in the medium-cost dormitory. Here expense in first cost and in maintenance must be considered. A basic assumption is that fireproof construction is desirable for two-story dormitories and essential for all dormitories more than two stories in height. Choice of basic construction methods as between wall-bearing, column and beam, steel or concrete, slab or joist

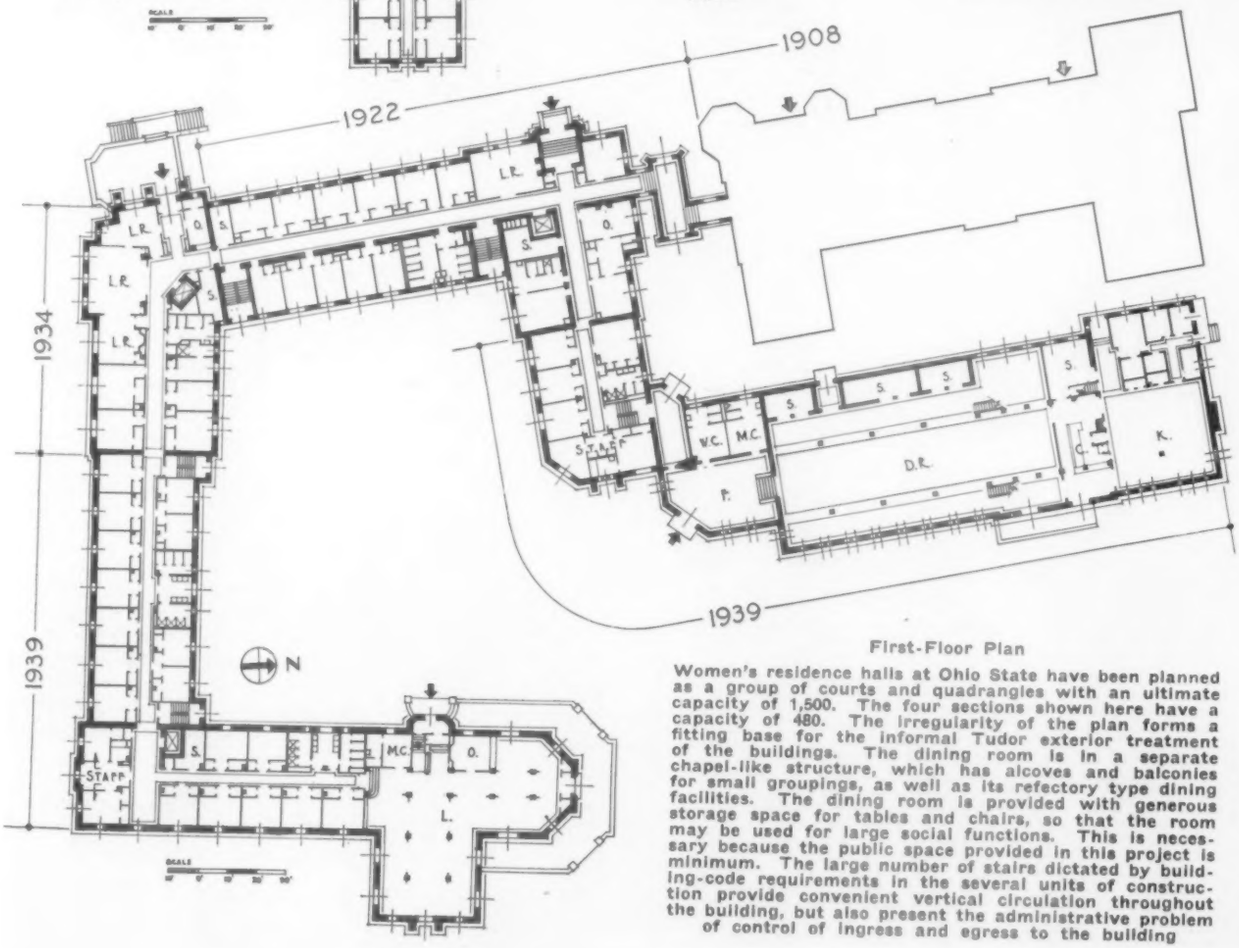
Joseph Nelson Bradford and Howard Dwight Smith, Architects



Typical Bedroom Floor

Large capacity at medium cost is provided in this project by reducing the public rooms to a minimum and by using a large part of the first floor for bedroom-studies. In spite of the informality of plan and exterior, economy of per-occupant cost has been forced by long corridors and duplication of room treatment. This makes the interior arrangement efficient but less picturesque than the exterior. The construction cost per occupant of the 1924 section is $2,200, of the 1934 section $2,000, and of the 1939 sections is $1,550. The gross cost of the 1939 sections (including all equipment, architect's fees and interest during construction) is $2,175

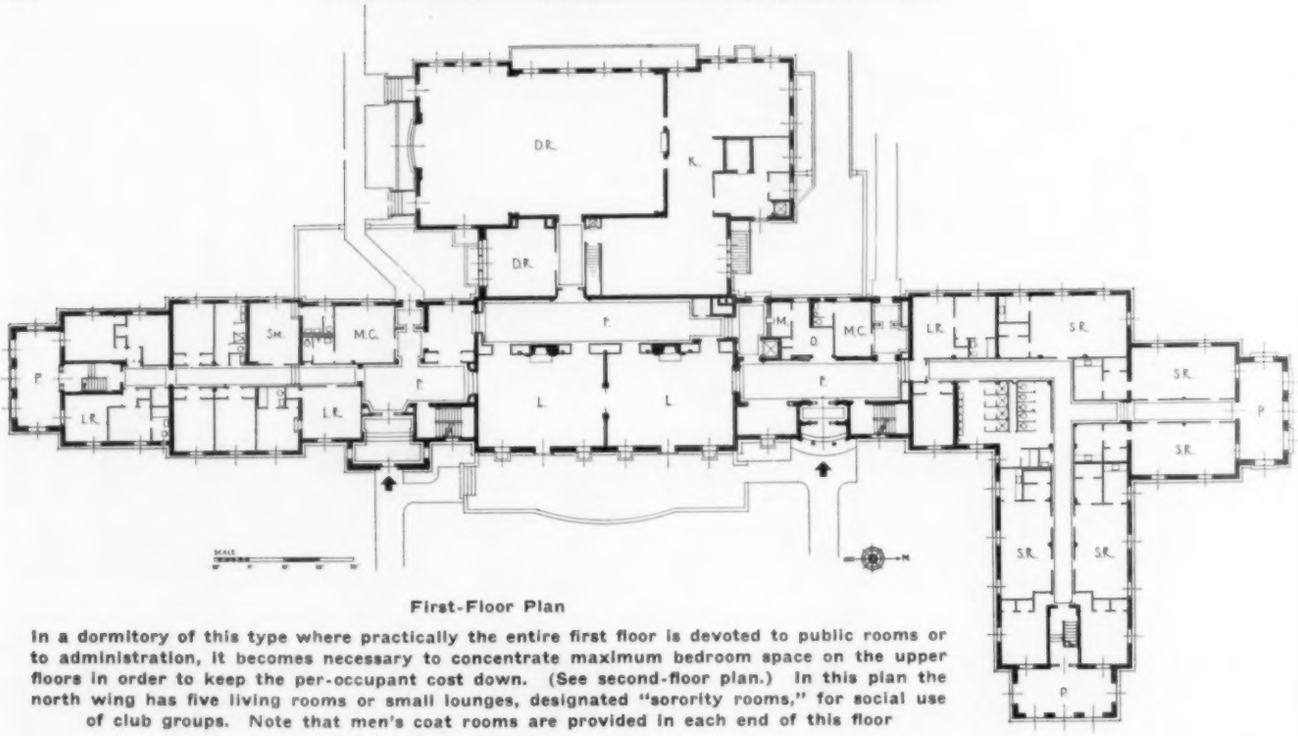
To create intimate domestic atmosphere in massive four-story dormitory buildings is always a problem for the designer. The use of Tudor architectural detail and informal composition is one device which helps accomplish this end. The tall lead spire at the intersection of two wings of Ohio State's Women's Dormitory dominates the large quadrangle of which these two wings are a part



First-Floor Plan

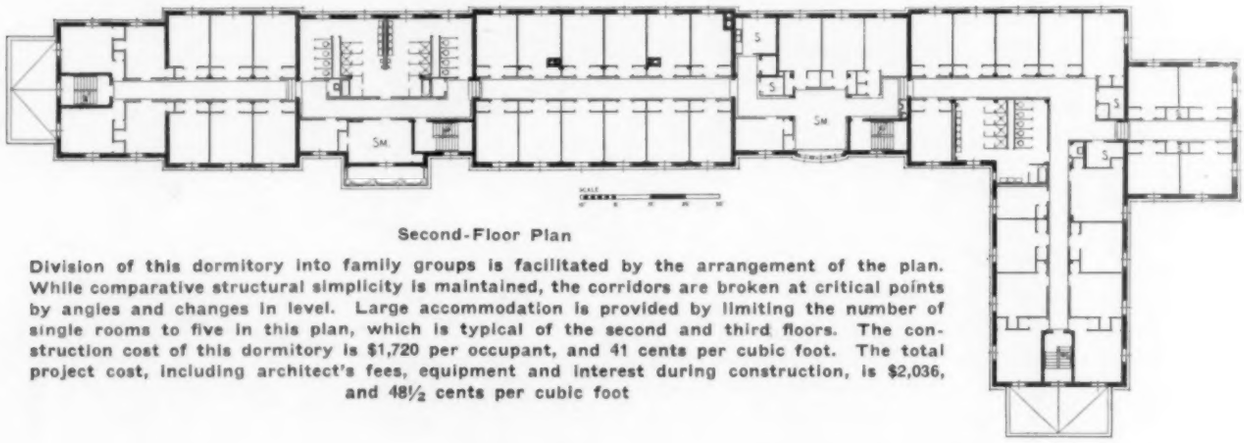
Women's residence halls at Ohio State have been planned as a group of courts and quadrangles with an ultimate capacity of 1,500. The four sections shown here have a capacity of 480. The irregularity of the plan forms a fitting base for the informal Tudor exterior treatment of the buildings. The dining room is in a separate chapel-like structure, which has alcoves and balconies for small groupings, as well as its refectory type dining facilities. The dining room is provided with generous storage space for tables and chairs, so that the room may be used for large social functions. This is necessary because the public space provided in this project is minimum. The large number of stairs dictated by building-code requirements in the several units of construction provide convenient vertical circulation throughout the building, but also present the administrative problem of control of ingress and egress to the building

Women's Dormitories, Ohio State University—1922, 1934, 1939



First-Floor Plan

In a dormitory of this type where practically the entire first floor is devoted to public rooms or to administration, it becomes necessary to concentrate maximum bedroom space on the upper floors in order to keep the per-occupant cost down. (See second-floor plan.) In this plan the north wing has five living rooms or small lounges, designated "sorority rooms," for social use of club groups. Note that men's coat rooms are provided in each end of this floor



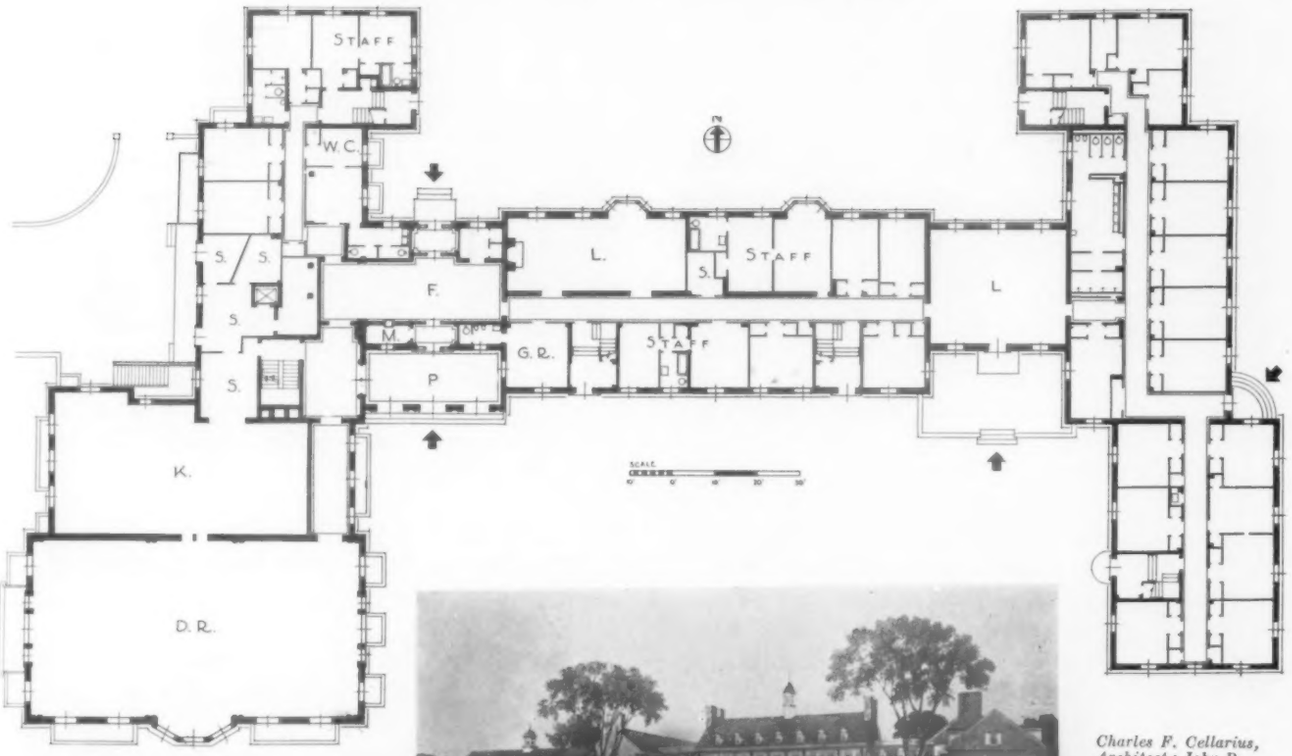
Second-Floor Plan

Division of this dormitory into family groups is facilitated by the arrangement of the plan. While comparative structural simplicity is maintained, the corridors are broken at critical points by angles and changes in level. Large accommodation is provided by limiting the number of single rooms to five in this plan, which is typical of the second and third floors. The construction cost of this dormitory is $1,720 per occupant, and 41 cents per cubic foot. The total project cost, including architect's fees, equipment and interest during construction, is $2,036, and 48½ cents per cubic foot

Emphasis of horizontal lines and of homelike details of windows, doors, dormers and chimneys, which are traditionally associated with Georgian and Early American architecture, gives an enviable domestic character to the Miami dormitories

John P. Schooley, Architect
Charles F. Cellarius, Consulting Architect

Women's Dormitory, Miami University, Oxford, Ohio—1938

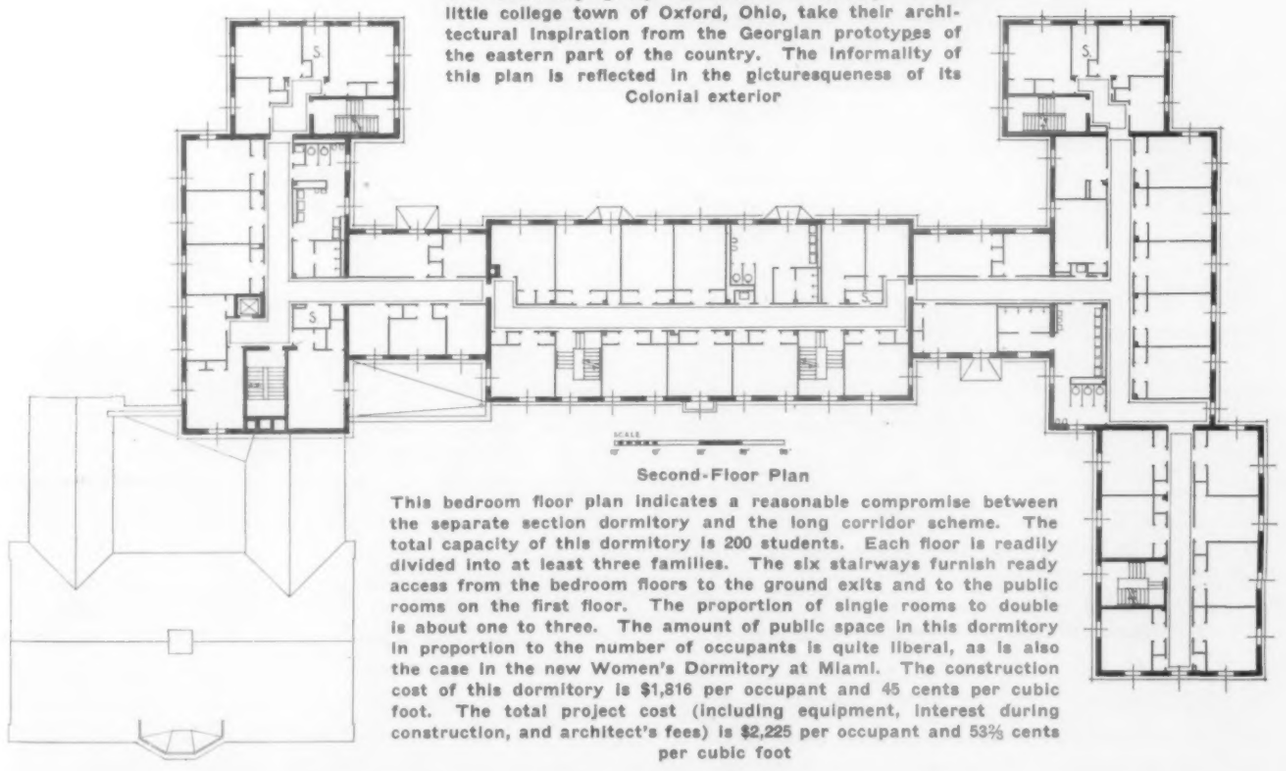


First-Floor Plan (above)

Placing the dining room in a single-story extension gives the effect of a separate building, but retains the convenience of access from all portions of the interior in bad weather. Student bedrooms are found only in one wing of this floor

Charles F. Cellarius, Architect; John P. Schooley, State Architect and Engineer

The dormitory groups at Miami University in the little college town of Oxford, Ohio, take their architectural inspiration from the Georgian prototypes of the eastern part of the country. The informality of this plan is reflected in the picturesqueness of its Colonial exterior



Second-Floor Plan

This bedroom floor plan indicates a reasonable compromise between the separate section dormitory and the long corridor scheme. The total capacity of this dormitory is 200 students. Each floor is readily divided into at least three families. The six stairways furnish ready access from the bedroom floors to the ground exits and to the public rooms on the first floor. The proportion of single rooms to double is about one to three. The amount of public space in this dormitory in proportion to the number of occupants is quite liberal, as is also the case in the new Women's Dormitory at Miami. The construction cost of this dormitory is $1,816 per occupant and 45 cents per cubic foot. The total project cost (including equipment, interest during construction, and architect's fees) is $2,225 per occupant and 53⅜ cents per cubic foot

Men's Dormitory, Miami University, Oxford, Ohio—1938

must be determined in the individual project. Preponderant current practice in two,- three- and four-story non-elevator projects seems to favor exterior and stair halls of wall-bearing with column and beam interior construction. Certain details of construction which have come into recent use in medium- and low-cost housing have proved sufficiently satisfactory to command their consideration even in higher-cost construction. Principal among these is the use of slab floors so constructed over forms that nothing but simple surface treatment is needed on the ceiling below. Greater skill and more highly developed techniques in the use of finished concrete surfaces for walls and ceilings of large rooms (along with exposed masonry materials) used purely as construction and not as applied decoration make these materials of increasing value to the designer as well as to the builder. Other structural features worthy of consideration are the greater use of exposed low-cost masonry surfaces (such as common brick, utility tile, and the like) for all corridor and stair walls and the application of sound-absorbing or acoustic correction material directly on the ceiling construction in corridors, the use of linoleum, mastic tile or rubber floor covering applied directly to structural floor surfaces, and the more extensive use of non-rusting metals for windows, doors, railings, fixtures and equipment.

Structural problems should hardly be dismissed without brief mention of windows. The particular design of the window as far as appearance goes is largely an individual matter of style. The old-fashioned double-hung window, the traditional outswinging casement in metal or in wood, and the newer friction-controlled projected types, all have their proponents. "Sales" proponents and "operating" proponents do not always agree on relative merits of the many different kinds of windows. Where design requirements permit, the double-hung type of window, by reason of its long and accustomed use, comes as near being foolproof as any. The increasing availability and use of metal windows, however, cannot be ignored, and three observations must be made in connection with them: (1) either they must be of non-corrosive metal, or care must be taken to prevent corrosion in concealed as well as in exposed parts; (2) operating devices (which are closely connected with screening problems) must be simple and sturdy; (3) ventilation convenience is greatly enhanced by in-swinging ventilator panels at the bottom of the window.

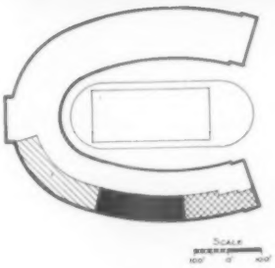
Heating—Plumbing—Electrical Equipment

The problems of mechanical equipment, those involving heating, plumbing and electrical work, are sufficiently technical and specialized to require expert attention. Administrators who have not had extensive experience with building programs should realize that an architect must have, either as a part of his own organization or in an active consulting capacity, competent mechanical engineering services in these branches of technical design. Such services are available at reasonable fees, and architects of large as well as small practice generally find this procedure advantageous. Large institutions usually have competent practical engineers in their departments of operation and maintenance, and close cooperation should be developed between the operating engineers and the designing engineers for best results. This means, of course, a sympathetic attitude on the part of the designing engineer to the existing system of operation, if there be one already established to which a new dormitory project might be connected. By the same token it means a receptive attitude on the part of the operating engineer to ideas from the outside which might be beneficial in improving existing operating conditions, particularly so far as they may be affected by changes and additions resulting from newly added projects.

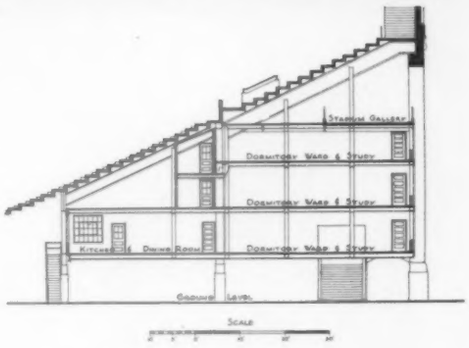
A few random observations of interest to the layman in the mechanical equipment field may not be out of place. Under the heading of plumbing, the engineer will insist on the concentration of toilet facilities for convenience and economy of piping installation. This concentration will involve not only the placing of toilet rooms vertically over one another to make multiple use of pipe stacks, but the concentration of fixtures in relatively large groups in each floor. Laymen should be advised also that the placing of rows of fixtures back to back with accessible pipe spaces between permits convenient and economical installation. The plan arrangement of toilet rooms so that the water-closet compartments are in a separate area, but immediately adjoining lavatories and showers, is desirable. In women's dormitories lavatories in the individual bedrooms are considered highly desirable when budget considerations will allow. Where this is not done, special thought should be given to adequate "dressing table" space in connection with lavatories in the central toilet room. This usually means somewhat larger central toilet areas in women's dormitories than in men's. In this connection attention is called to the adequate toilet planning in the Women's Dormitory of Miami University. Men's dormitory toilets do not generally require tubs, and their use in women's dormitories is becoming more and more restricted.

Under the heading of heating, my principal observation is that the plant should be designed and installed with as much consideration for its condition and economy of operation after twenty years of use as for its immediate installation. If the materials used and the size and location of pipes and equipment are determined from this point of view, some decisions will be made which may not check with the

Howard Dwight Smith, Architect; Clyde T. Morris, Engineer

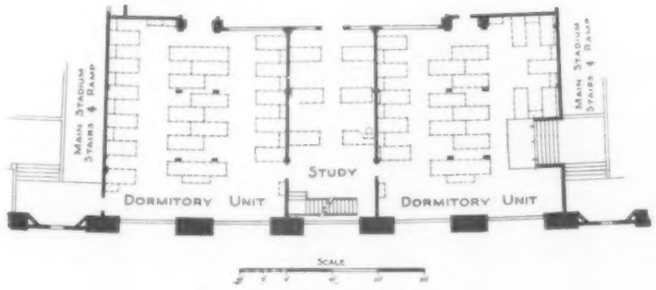


Ohio Stadium was originally designed to provide space under the seat banks for parts of the physical education program. Some of the space originally intended for basket-ball courts, handball courts, wrestling rooms, corrective exercise gymnasiums and locker rooms is now being used for dormitory purposes. The diagram at the left shows the location of the dormitory clubs



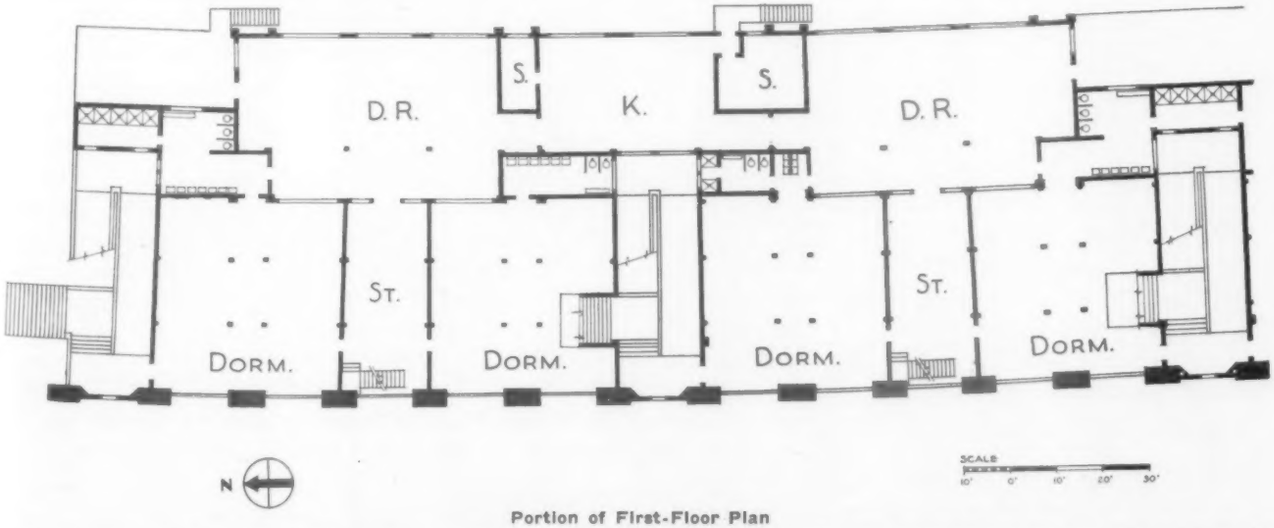
Typical Cross-Section (above)

A dormitory club consists of 120 members and occupies a single section of Ohio Stadium approximately 60 feet long and three stories high. The first floor is 11 feet above the ground and offers no interference to free circulation to and from the 63,000 seats in the Stadium. Each dormitory club has two dormitory wards and one study on each of three floors. Each club has its own dining room on the first floor. Two clubs share a common kitchen. Since 1934, Stadium dormitory clubs have been operating on a cooperative basis. Low construction costs and low operating costs make this type of housing very inexpensive, and since admission to the dormitory clubs is highly selective on scholarship and achievement bases, opportunity is presented to a certain class of students who might otherwise be denied the advantages of college education



Typical Plan of Club Unit

This diagram is typical of the second- and third-floor layout of the individual club units at Ohio Stadium. Each club consists of six families of twenty members. A common study is provided for each two families. Because the ward type of dormitory is used, the per-occupant cost is as low as $650 (including the proportionate share of the original cost of the Stadium, which was built in 1921)



Portion of First-Floor Plan

This diagram shows a single kitchen of approximately 1,000 square feet area, serving the dining rooms for two club units of 120 members each. The spaces indicated as studies between the dormitory units on this floor are also used as dining-room lobbies

Ohio University Stadium Dormitories, Columbus, Ohio—1934 and 1938

economy of the moment, but they will be wise decisions. I may observe also that architects and their designers will want to conceal heat pipes and put them into most inaccessible places. Maintenance engineers will want to expose them, and oftentimes in the most unsightly positions. Compromise is desirable in such cases, but the designer must realize that modern mechanical equipment is a practical necessity and its use and location as a part of the esthetics of this problem cannot be overlooked. Other details under heating might be mentioned which are of interest to the administrator and the layman. Has air conditioning become practical enough and economical enough to be considered in medium-cost dormitories? This final observation may be made: the development of the light metal fin type of radiator, either enclosed to form a gravity convector or with a fan for mechanical propulsion of air, has reduced the size and enhanced the appearance of units required for heating small rooms and for the combined heating and ventilating of large rooms, so that now large and unsightly units need not be tolerated if a little constructive thought is put on the problem.

Of electrical gadgets there is no apparent end, and no dormitory of today should omit receptacles or so-called convenience outlets to accommodate them. The increased use of movable lighting fixtures, study and reading lamps has reduced the number of permanent lighting fixtures required in public rooms as well as in bedrooms and studies, but electric irons for pressing and toiletry, beverage pots, heating pads, sewing machines, electric razors, ventilating fans, and other accessories yet to be devised, need to be provided for conveniently and with safety.

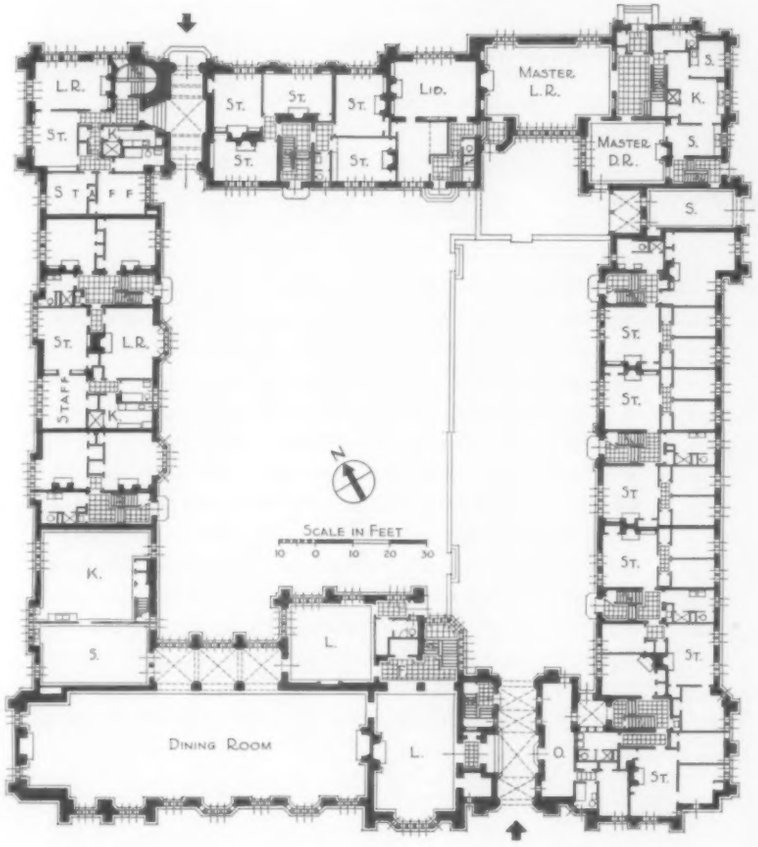
Esthetic Planning

The esthetic problems involved in the building of college dormitories should be considered of no less importance than in other college buildings. Administrators must recognize the educational value of good physical environment, of surroundings which have an air of grace, culture, refinement, good taste, all of which are attributes of beauty and elegance. An eminent educator, in a fervent appeal for appropriations for his state-supported institution, recently remarked that his need was "for facilities, not for architectural monuments." By this remark he gave expression to an all too prevalent conception that there must be conflict between esthetic considerations and practical results, between beauty and low cost. Architects ordinarily cherish the opportunity to produce results which are esthetically acceptable not only to themselves and to their clients, but to society in general, and while it is recognized that generous budgets contribute to this opportunity by permitting the use of expensive materials, and the application of attractive embellishments and finish, it is equally true that the principles of good proportion, good composition and general good taste can be applied in the simple, inexpensive project as well.

The simulation of home atmosphere is of prime importance and any architectural arrangement or device which can produce domestic character is desirable. Where this can be accomplished by the cottage plan, or by separate small residential units, these results are not too difficult of attainment. In the large buildings made necessary by placing many living units in a single structure, there must first be careful group planning, to assure orderly and logical arrangement of parts. The division of the large group into family units, which has previously been referred to as an administrative problem, is of importance here. The careful juxtaposition of these family units with dining rooms, social areas and study or library units must be depended upon to produce the desired effect of orderliness and fitness.

The placing of points of exterior architectural interest is important in group planning. The presence of a tower does much to centralize interest in a group, if for no other reason than that it is a help to the student in orienting himself physically with reference to his own quarters. Likewise, a well-developed main entrance feature, a court or a gateway, becomes a sort of esthetic anchor. Where large dormitory projects are contemplated, it is important that the skeletal plan of the completed group should be considered before individual units or parts of the group are built, and that the locations of centers of architectural interest should be predetermined. It is obvious that these principles of esthetic planning are quite independent of budget limitations. They may apply as well to the low-cost type as to the luxury type of dormitory construction. Incidentally, it is well to remember that the effect of well-composed architectural treatment concentrated at critical points, and the judicious use of carefully chosen embellishment at those points, is enhanced by the contrast with plainer treatment elsewhere. The use of this principle in architectural design is not only good esthetics but good economy as well. The inherent good taste of the frugal colonial New England householder inspired him to concentrate his single embellishing effort on the front-entrance feature of his simple rectangular home, and the careful simplicity of the whole emphasizes the charm of the door or portico.

The choice of architectural style for the exterior dress of college dormitories is perhaps a minor esthetic problem. The blind copying of the forms and details of any style or period is no sounder in architectural practice than it is in educational procedure. Present-day American life and culture, however, have grown so fully from English and Colonial backgrounds that the inspiration of the domestic architecture of these cultures seems logical. At any rate, it is significant



Courtesy of The American Scene © *Samuel Chamberlin*

This view of the northeast corner of the court of Calhoun shows the refined quality of Tudor architectural character used in the brick and stone construction of this college. The wall and the low gable in the corner are details of the Master's House and give a domestic atmosphere which is quite desirable, and ofttimes difficult to obtain in such large structures

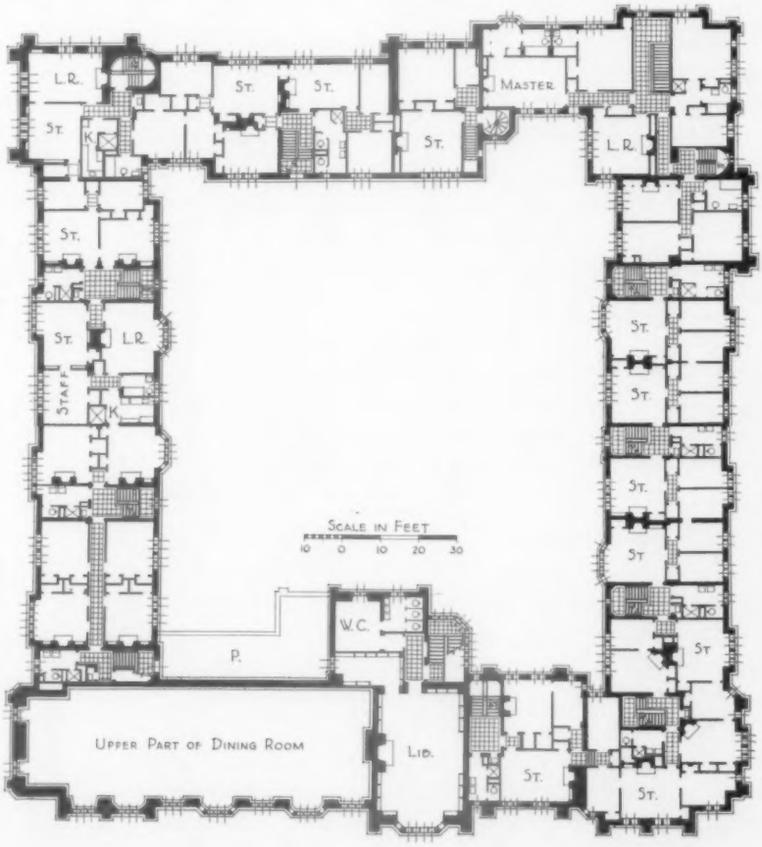
Office of John Russell Pope, Architects
Otto R. Eggers Daniel Paul Higgins

First-Floor Plan (above)

Calhoun is an example of the rather widespread practice in the large universities in the past score of years of accommodating administrative, educational and dormitory facilities of small groups of students within one structure. The generous use of public space on the ground floor for the dining room and its services, common rooms, libraries and Master's House, indicates that there can be little or no common basis of comparing per-occupant costs with structures in which the principal objective is simply the housing and feeding of students

Second-Floor Plan (at right)

The complete absence of corridors in this plan, the access to individual suites from a stair hall, the combination of bedrooms with studies, and the presence of a fireplace in every study, are some of the features which give even so large a structure as Calhoun many of the characteristics of home. This college accommodates 167 students in studies and bedrooms. The structure's 1,350,000 cubic feet thus gives the generous average of 8,000 cubic feet net per occupant



Calhoun College, Yale University—1931

that by far the largest part of the college dormitories in this country take their architectural style from the precedent of English Tudor and Georgian architecture and their various Early American and Colonial derivatives of these English styles. The current influence of the so-called "modern" trends in architectural design seems based primarily upon frugality. The complete elimination of architectural detail and embellishment simply adds to the designer's problems of fundamental composition, and has emphasized the possibilities of modern methods and devices for decorative illumination, the generous use of fabrics in furnishings, and the value of applied color. The use of applied color has proved particularly helpful where broad surfaces of concrete on walls, beams, and ceilings have been left just as they came from their forms.

The increasing recognition of the educational value of guided study of the problems of living during a college career, or perhaps the renaissance of that fundamental idea in large colleges and universities, together with the self-liquidating nature of a part, if not all, of their capital costs, has created lively interest in this type of construction during the past few years, and suggests continuing interest in the immediate future. This means, where properly administered, the possibility of more intimate contact between educator and student—a development of the traditional educational philosophy of Mark Hopkins—that the essence of the educational process is the actual getting-together of the instructor and the student.

A Problem of Cooperation

It should be emphasized in conclusion as in the beginning that cooperation between administrator and architect in the building of dormitories is essential. Assuming that such cooperation has produced a well-planned, easily operated, easy-to-look-at and easy-to-live-in dormitory, there remains one problem, the solution of which lies outside the province of the architect, but which he knows must be solved in some satisfactory manner if the best ends are to be served by the continued construction of dormitories. This is the problem of cooperation between educational objective and financial operation of the dormitory project, and the question invariably arises: "Shall the director of dormitories be a business man or an academician?" Happy is the institution which has, somewhere in its personnel, the rare individual who is both.

EQUIPPING THE SMALL HOMEMAKING DEPARTMENT

By RUTH FREEGARD

Chief, Homemaking Education Division, Michigan State Board of Control for Vocational Education

THE equipment in a homemaking department, and its arrangement, reflect the scope, depth and sincerity of the teacher's philosophy regarding her chosen work. Since the Michigan state committee for planning equipment-guides feel very keenly that the furnishings and their arrangement should express a philosophy of homemaking consistent with present-day needs, they decided to work on a simple evaluation questionnaire which would be useful to teachers wishing to improve their departments as well as helpful to school people, architects and equipment salesmen planning new departments. It is suggested that students and teachers evaluate their departments, reading into the following items as many implications as possible, and then make plans for personal and class-planned efforts and purchases that will best contribute to the improvement of homemaking education in the community.

As Others See You

I.

Are the first impressions of the homemaking department favorable?

Is the room attractive and clean?

Do the furnishings and the bulletin boards suggest the units or the lessons that are being taught?

Is illustrative material displayed that challenges interest and closer inspection?

Have the furnishings been arranged to the best advantage for efficiency and esthetic satisfaction?

II.

Is there evidence that varied aspects of homemaking are taught?

Does this include provision for social training, home furnishing, family health, personal improvement, esthetic satisfaction through furnishings?

III.

Has the department been furnished in terms of community needs and community improvement?

Are stoves, cupboards, accessories, etc., provided that are possible in homes of the community and will tend to promote desirable standards in the homes?

IV.

Is efficiency exemplified in the arrangements of furnishings of the department?

Have the storage facilities been well utilized?

Is there adequate space for students' materials, aprons, etc.?

Is it possible for students to work in family-sized groups?

Are learning-materials easily accessible for student use?

V.

Do the room and equipment show consideration of student health?

Is there working space for each student?

Is lighting adequate, both natural and artificial?

Do chairs and tables promote good posture?

Does equipment provide for sanitary standards and practices such as concern disposal of garbage, elimination of flies, mice, etc.?

Can the furnishings, floors, walls, woodwork, etc., be kept clean with reasonable effort, and does the condition of their finish present desirable standards for home duplication?

VI.

Do the room and its furnishings help students to recognize art as a functioning part of their lives?

Are furnishings and accessories suitable in texture, color, design for the rooms and the activities to be conducted in it?

Are the walls restful in color and do they serve as suitable background for furnishings?

General Suggestions

The following general guides for equipping departments were suggested by the Federal Office for Homemaking Education as helpful in planning for new departments or in evaluating established ones:

1. The homemaking department should provide for instruction in those responsibilities that are common to the girls and homemakers in the community.
2. Rooms, furnishings, and arrangements should be planned in relation to the pupil activities and experiences that are essential for the achievement of the objectives of the various units of instruction.
3. Furnishings and equipment should be selected so far as possible to serve more than one purpose.
4. The standards in the homemaking department should be consistent with those that prevail in the present average homes of the community.

Facilities for Small Departments

The following suggestions and lists were prepared for a partial guide for small high-school departments, but may be a partial guide for large departments:

A laboratory room and a living room, both serving a composite of class activities, are recommended where there is but one teacher for homemaking groups. The "homemaking living room" is so furnished as to be in daily use. The uses which have influenced the selection of the furnishings include home nursing demonstrations, bedmaking, meal serving, demonstra-

tions and social occasions with food service and suitable entertainment, child care, arranging furnishings for efficiency and esthetic satisfaction, caring for home furnishings, practice in selecting and buying additional furniture or accessories, and garment fitting. The furnishings and replacements for the room provide excellent educational opportunities when the pupils make the selections as a part of class work.

The facilities should promote desirable standards in efficiency and good taste in the various aspects of homemaking for which school training is provided. Types of homes in the community served should be considered in selecting the type and quality of equipment.

GENERAL ITEMS

A. Minimum-combination Homemaking Laboratory and living room.

B. A laboratory large enough for the purpose and for enrolments expected; good day and artificial light, temperature, ventilation, clean, cheerful and attractive. A gage for size is an allowance of 30 square feet per pupil. (Preferably not in basement.)

C. Facilities should be provided for work in meal preparation and serving, home furnishing, social experiences, home nursing, bedroom care, garment making, and laundering, although these need not be in separate full-sized laboratories. Arrange stationary fixtures against or near walls. Keep movable furniture in center of room.

D. Storage space for each type of work should be ample and convenient. This should include storage for filing folders and clippings for aprons, garments, staples, books, magazines, illustrative materials, china, silverware, towels, table linen, bedding, cleaning equipment, posters, general and reserve equipment, etc.

E. Blackboards 8 to 16 ft. of slate. Bulletin boards 6 to 12 ft., low enough for reading clipped articles—cork or wallboard preferred.

F. Comfortable chairs with saddle seats 17 in. high and backs.

G. At least two windows screened.

H. Teacher's desk—preferably one with deep drawer for filing folders.

I. Reference books, bulletins, magazines, and illustrative materials for each type of work.

EQUIPMENT

A. General Equipment

Homelike groupings for work units in a combination Homemaking Laboratory, or Unit Kitchens in departments with separate food laboratories with different kinds of cabinets, stoves, sinks, etc., at different cost levels.

Supply and cutting table 3½ x 5 to 7 ft. with cupboards and drawers (not essential if adequate storage and table space otherwise provided)

1 hand towel holder with paper towels—near sink or lavatory
Waste-basket
1 broom
1 mop
1 dustpan
1 bucket
1 paper roll and fixture with paper 28 in. to 4 in. wide

B. For Foods Work

1. A recommended work unit is equipped with a kitchen cabinet with work space for two pupils, a sink with left-hand drain board or combination tub-sink, a stove with four burners and an oven, and a small table with drop or extension leaves and a tote tray compartment beneath, which can accommodate two pupils when closed or four pupils when open. Such a work unit can be used for many of the homemaking aspects taught.

2. Appropriately designed storage space for adequate care of general cooking equipment, staples, perishables, silver, china, linen, towels, pupils' aprons, cleaning materials and tools. A refrigerator is necessary where hot lunch is served or no cool place is available.

3. Wet towels and dish-cloths—provide as rapid drying as possible and arrange so that pupils are responsible for their own. Rods on tables or in aerated cabinets or racks with pulleys drawing toward ceiling; or clothes-horses may be used.

4. Stoves—allow one burner per pupil. Stoves with fuel commonly used in the homes are considered desirable. Gas, electricity, oil, coal or wood acceptable. There should be one built-in oven at least for each eight pupils.

5. Sinks—allow at least one sink for eight pupils. The types of sinks selected may vary according to location and space, but at least one of the sinks should be of white enameled iron or porcelain with back and drain in one piece. A combination sink and tub is urged for washing large kettles, dyeing and laundering. An enclosed sink is desirable for storage of cleaning supplies.

6. Suitable table, chairs, china, silver and linen for serving meals for six to eight persons.

7. One all-wool blanket for fire protection.

8. Sufficient small equipment to develop desirable standards for meal preparation and efficient use of time and energy.

a.

Garbage pail—covered
1 metal flour can of 48 lbs. capacity
1 tin or stone container for sugar
4 doz. sanitary dish-cloths for dish-washing
4 doz. towels for drying dishes (may be hemmed flour sacks)
1 qt. measure
2 lemon squeezers
1 can opener
1 corkscrew
1 grater
1 food chopper
1 colander for the sink, and one extra
1 teapot
1 coffee pot
6 bowls, approx. 8″ diameter
6 bowls, approx. 11″ diameter
1 scale—family size, 24 lbs. capacity
1 flour sifter
1 water pitcher—2-qt.
1 potato masher
2 large kitchen knives
1 long-handled fork
1 long-handled spoon
1 hot jar holder
1 double boiler—2-qt. size
2 large saucepans with lids
1 large skillet
1 large teakettle
1 enamel or aluminum round dipper
1 nickel-plated or aluminum tray
4 to 6 trays—about 12″ x 16″

b. Equipment for each pupil

Good steel paring knife
Enamel or earthen or pyrex custard cup
Fine-mesh wire sieve strainer, 6″ diameter
Tin bread-pan—½-lb. loaf
Small china bowls, 3-4 cap'y or approx. 6″ diameter
Mixing bowl, 9″ enamel or earthen
Plate—plain white—7″
Cup and saucer
Plated or aluminum teaspoon
Plated or aluminum tablespoon
Fork
Case or table knife

c. Equipment for every two pupils

1 dishpan } or 2 dishpans
1 dish drainer }
Spatula
½-pt. glass measuring cup
½-pt. tin or aluminum meas. cup
Muffin pan—4 or 6 holes
Pie tin—6″ diameter
Layer-cake tin
Biscuit cutter
Double boiler—1-qt. aluminum
Small-size frying pan
Saucepan—1 pt.
Small tray or shallow utility pan for service in carrying supplies to desk from supply table

d. Equipment for every four pupils

Teakettle, if hot water is not always on tap
Pepper shaker
Salt shaker or covered glass jar
3-ft. towel rod for each cooking table or equivalent in rack
Waste jar for matches, etc.
Dover egg beater or similar
Egg whip
Vegetable brush
Scrub brush

C. For General Class Work

1. Tables, not over 30″ high and having ample knee space. Tops of 2-inch well-seasoned and filled hardwood or other suitable, easily-cared-for finish. Open tray space or drawers

at least 4" deep. Trays to fit open space in tables or drawers, sufficient to accommodate each pupil. Allow each pupil 2 x 2½ ft. table space.

2. Storage space with locks on doors for tote trays for each pupil.

3. Garment case or closet with rod and hangers which can be locked.

4. Sewing machines, standard make, allowing one machine for four girls, with chairs for each.

5. Such small equipment as 1 or 2 ironing boards, 1 or 2 irons (electric preferred) with signal light at wall socket, iron stand, ½-doz. yardsticks, pinking shears, 1 T-square.

D. For the Homemaking Living Room

The homemaking department may have one room serving the varied purposes described for the homemaking living room in the introduction, or may have the use of more rooms among which these purposes are divided.

In the living-room plan, most of the furnishings may be so chosen as to serve more than one purpose. The more essential items include:

1. *Major items which should be provided through the school*
   - Cot-couch or studio couch with firm springs and good mattress (not a mattress pad)
   - (A settee, built-in seat or davenport may be used where there is a separate bedroom)
   - Table—one for six or more guests, of refectory type, with concealed leaves or a drop-leaf-extension type
   - Case, chest or cupboards for books, china, bedding, table linen, silver, etc.
   - Full-length mirror—if no separate fitting room
   - One or more upholstered chairs
   - Rug
   - Folding screen
2. *Small items*
   - Place covers, silence pad, table-cloth and napkins
   - China, silver, and glass of suitable quality and design, for serving 6-8 persons
   - Pillows, single blanket, sheets and pillow-cases, first aid kit
3. *Items which may be provided through gifts or earnings of the girls and chosen by them after study*
   - Vases, bowls, plants
   - Pictures and wall textile hangings
   - Couch cover and cushions
   - Small table runners
   - Bathinet, bassinet and infants' articles

Homemaking classes in Tecumseh, Mich., use this three-in-one room

FINE POINTS OF FOOD-SERVICE EQUIPMENT DESIGN

Based on a Discussion of an Outstanding Installation in a Large Eastern University

By OWEN WEBBER

Counsel on Public Feeding

BECAUSE food service in schools and colleges is customarily conducted on a non-profit basis and with a high proportion of student help, members of the paid staff often develop a lackadaisical attitude. For this reason, especial care should be taken in laying out the plant, incorporating labor-saving devices and every automatic feature that will eliminate irregularities of human operation, and providing sturdy equipment of design and materials that will minimize depreciation and present the smallest problem in cleaning.

This discussion will in the main be confined to describing and illustrating an installation which incorporates many commendable features of modern food-service equipment design.

Materials and Design

This counter operates under exceptionally good management and caters successfully to two groups of students: those who are given all-inclusive food service for $4.00 per week; and those who select at each meal items of choice, and are able to pay proportionately. Smooth operation of this dual service schedule from one counter is no mean task, especially in catering to students who have not attained a tolerant attitude.

The equipment is entirely constructed of 18/8 stainless steel, for permanence and harmony in the color scheme, and for ease in cleaning. The substructure extends to the floor, with recessed toe space in the rear, and a molded stainless base in front, supporting a flush Formica facing of deep oriental red, softened by a secondary process of vulcanizing over the colored base an overlay of clear Formica in which was introduced a photographic interpretation of the weave of black linen fabric. The continuity or decorative merging of metal base and facing was furthered by inserting flush with the Formica a series of metal inlay strips graduating in width and successively diminishing in size; this motive encroaching up the front to a distance equal to one-fourth of the height, leaving a fair proportion of the block color area undisturbed.

The salad cold pan has a stainless steel refrigerator under it of calculated capacity to receive trays of prepared salads, held in proper condition and available for immediate replenishment. The steam table is of the open bain marie type, in which the top comprises a series of stainless metal panels, each 14-½ x 20-½, which, when all removed, reveal the pan underneath without surface cross-members or struts of any nature. A number of these panels which are cut out to receive a variety of full entree pans, half-pans, soup, vegetable and gravy inserts, together with a half-dozen solid panels, are stored in a tier underneath, on stainless angle slides, to accommodate any change of menu necessitated under the planned schedule. The pan under the top was insulated and divided into three sections, so that any one or all sections can be operated at will, with one section only made active for breakfast, and the remainder having the solid panels in place, providing a set-up area for electric short-order equipment—toasters, griddle, waffle-irons, frying equipment, and the like. In the rear of the counter areas are provided for the storage of this auxiliary electric apparatus, each to prescribed and proper size. Several polarized plug-in stations accommodate the operation of the respective units.

In proper sequence, one observes a supplementary cold pan to receive several trays of butter chips, separated by spacing lugs, and in the rear a removable insulated stainless collar to receive at certain meals three bulk fruit-salad inserts, to dish out for the inclusive-meal students.

The section of counter top for display of pies and various desserts is shaped with square turned-down edges, and returned on the horizontal to meet the counter facing back and front, eliminating dirt pockets and also permitting the maximum exposed top bearing surface for display.

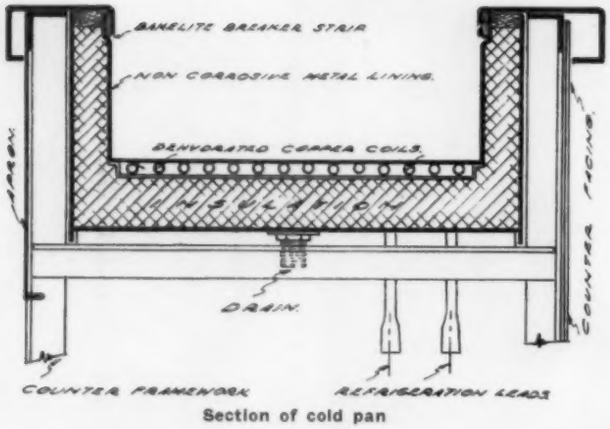
Features of Display

All display shelves are supported on inconspicuous cantilever brackets functioning on stainless tubes anchored down in the counter substructure for rigidity.

The shelves are of heavy Hercules glass with fully rounded sides which minimizes any likelihood of the edges chipping and injuring the food display, also making it possible to dispense with any horizontal tube supports. The effect of such display shelving is quite spectacular, in that the items are apparently pleasingly suspended, and temptingly awaiting, and

Courtesy S. Blickman, Inc.

Installation of food-service equipment, College Commons, Syracuse University



Section of cold pan

the elimination of the usual contraption of a maze of metal framework is a relief to the eye, and also prevents an awkward cleaning problem.

The dessert cold pan is immediately adjacent to the one provided for cartoned milk service, and both of these pans run well back to the rear of the counter, and have removable insulated panels in the rear, which when in place form useful set-up areas, and when removed enlarge the capacity of the pans for varying volume of service or changing requirements of each respective meal, or release accommodation for the set-up of melons or other large fruit in season.

The ice cream cabinet top proper sets just below the actual counter surface, permitting the introduction of a metal covering panel, which when set in place conceals the cabinet top, which is not of constant value throughout each day. The counter top is augmented accordingly for other needful purposes.

Features for Convenient Service

Important service features are the "Lowerators." These are self-leveling wells built into the counter to handle plates, cups and saucers. They can also be used for the cafeteria trays and do away with the unsightly appearing bulk of tray tiers at the beginning of the average counter.

These wells have their chassis built in with the counter framework and are loaded from the top. By an ingenious arrangement of calibrated springs, chains and sprockets (compensated to the weight of whatever type of tableware in use), these articles are raised up automatically and silently, so that the upper one is always just slightly above the counter top, ready to be picked up. Glasses are loaded in wire Protectrays, five to each well, with twenty glasses to each frame. The illustration shows coffee cups accommodated in like manner.

Plate wells are incorporated in the steam table and are reloaded from crockery immediately available in the customary warmer underneath the table.

The "Lowerators" eliminate stooping, and provide quick, convenient delivery, with no stacks or groups of tablewear cluttering up the counter top. The wells are insulated and heated by steam coils or electricity, and chilled by refrigeration, if desired; all at small operating expense.

The cold pans in this specific installation are of efficient design, having a non-corrosive inner shell or lining with 5/8-inch diameter dehydrated copper coils properly contacted and secured to the outside of the pan lining. The entire pan with attached coils is insulated with 2 inches of cork and sheathed with galvanized iron. Such a cold pan is easy to clean, no coils being visible, and the refrigeration effectivity is concentrated on the lining proper, with little loss in other directions.

This counter is connected direct to two remote automatic compressors, one to accommodate the salad refrigerator and cold pans, and the other the ice cream cabinet.

Other service refinements include two electric roll warmers, with drop-front drawers, one built in as a part of the steam-table substructure to accommodate reserve pans of food, and the other under the breads section for replenishment of hot rolls and biscuits in proper condition.

The nest of drawers seen in the picture are of stainless steel, with boxed fronts, where all edges are returned at right angles, for stiffness and appearance. These units operate on ball-bearing extension arm slides, have snug-fitting cork lino pads cemented in the bottoms, silencing their operation, and are each of a size for a specific purpose.

The counter top is 3 feet 2 inches from front to back, instead of the customary 2 feet 6 inches. This lined up the back of the counter to trim effect, and the additional depth increased the service capacity and afforded a useful work area or dishing-up space for the service.

All storage areas under the counter were held to a uniform depth of 20 inches, which is a useful reach. To carry these shelves on through the full width of the counter would only have created areas difficult to keep clean, and, consequently, likely to become cluttered up. The foreshortening was accomplished by running a supplementary stainless partition down the counter substructure.

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Acoustical Treatment—Insulation

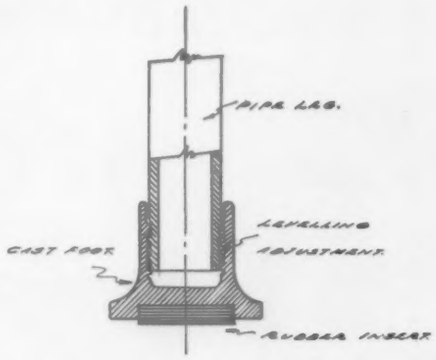
Very little attention has been paid to the acoustical angle of food-service equipment. All metal tables, especially dish tables, are unwittingly produced sounding boards, which augment the clatter of dish impact and build up a substantial volume of noise. Tables in the vicinity of dishwashing pantries are usually shunned, because of the nearby clatter. The remedy for such a situation is very simple. The application of a 3/16-inch thick coat of "Tanco" to the underside of the table, and the insertion of a rubber disc seated in a recess fashioned in the bottom of each foot, cushions the table from the floor and quiets the apparatus to a marked degree.

Warmers, steam-table pans and bain maries should be insulated, which not only minimizes unnecessary radiation of heat, but effectively blankets the metal, materially reducing operating clatter.

Food-service departments for colleges and secondary schools are subject to periods of disuse during vacation disbandings. At such times, depreciation can easily be accelerated unless due care is taken in choosing suitable materials in the fabrication of the equipment.

Wise Spending Above the Basic Minimum

An evident truth about food-service equipment purchases, which many either overlook or have not realized, is that everyone has to embark on approximately the same proportional expense per unit for the most elementary quality—and many people unwisely stop there. Every dollar spent over and above the basic minimum with a capable firm provides refinements and quality which are of value far in excess of the proportional increase in the cost of the equipment.



Cross-section of cushioned foot

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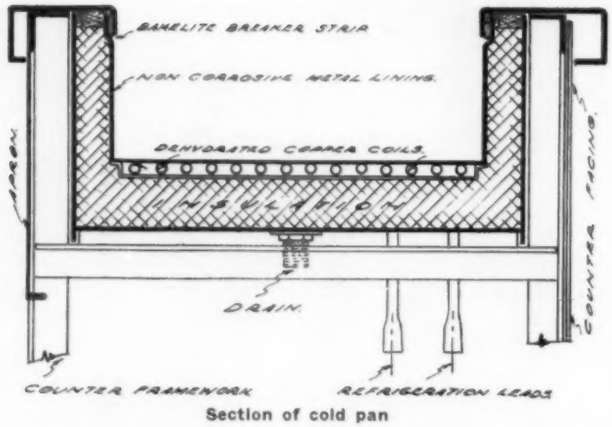

Section of cold pan

the elimination of the usual contraption of a maze of metal framework is a relief to the eye, and also prevents an awkward cleaning problem.

The dessert cold pan is immediately adjacent to the one provided for cartoned milk service, and both of these pans run well back to the rear of the counter, and have removable insulated panels in the rear, which when in place form useful set-up areas, and when removed enlarge the capacity of the pans for varying volume of service or changing requirements of each respective meal, or release accommodation for the set-up of melons or other large fruit in season.

The ice cream cabinet top proper sets just below the actual counter surface, permitting the introduction of a metal covering panel, which when set in place conceals the cabinet top, which is not of constant value throughout each day. The counter top is augmented accordingly for other needful purposes.

Features for Convenient Service

Important service features are the "Lowerators." These are self-leveling wells built into the counter to handle plates, cups and saucers. They can also be used for the cafeteria trays and do away with the unsightly appearing bulk of tray tiers at the beginning of the average counter.

These wells have their chassis built in with the counter framework and are loaded from the top. By an ingenious arrangement of calibrated springs, chains and sprockets (compensated to the weight of whatever type of tableware in use), these articles are raised up automatically and silently, so that the upper one is always just slightly above the counter top, ready to be picked up. Glasses are loaded in wire Protectrays, five to each well, with twenty glasses to each frame. The illustration shows coffee cups accommodated in like manner.

Plate wells are incorporated in the steam table and are reloaded from crockery immediately available in the customary warmer underneath the table.

The "Lowerators" eliminate stooping, and provide quick, convenient delivery, with no stacks or groups of tablewear cluttering up the counter top. The wells are insulated and heated by steam coils or electricity, and chilled by refrigeration, if desired; all at small operating expense.

The cold pans in this specific installation are of efficient design, having a non-corrosive inner shell or lining with 5/8-inch diameter dehydrated copper coils properly contacted and secured to the outside of the pan lining. The entire pan with attached coils is insulated with 2 inches of cork and sheathed with galvanized iron. Such a cold pan is easy to clean, no coils being visible, and the refrigeration effectivity is concentrated on the lining proper, with little loss in other directions.

This counter is connected direct to two remote automatic compressors, one to accommodate the salad refrigerator and cold pans, and the other the ice cream cabinet.

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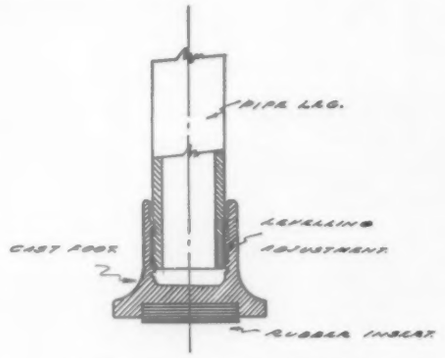

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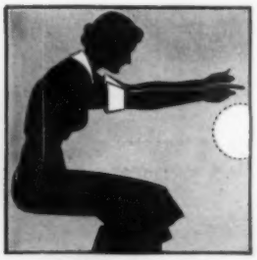
THE IRONRITE IRONER COMPANY

38 Piquette Avenue — Detroit, Michigan



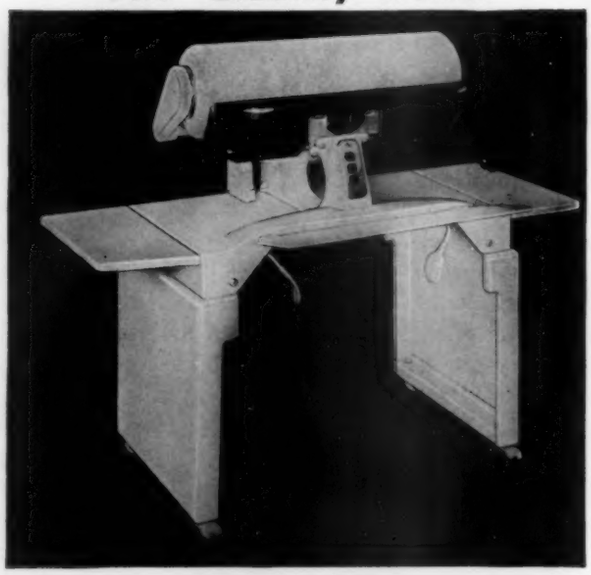
The Old-Fashioned Way —Difficult and Tiresome

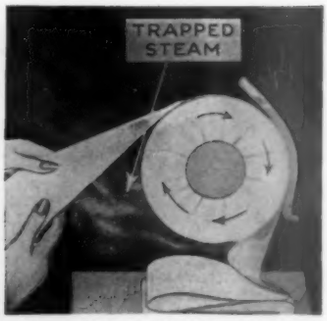
The Ironrite Way— Relaxed, Comfortable, Restful

At Right—Model 70
Write for Illustrated Circular

Ironrite

The Quality Ironer





The Old Way

The Modern Ironrite Way

IRONRITE for the Home Economics Department

Ironrite, the **modern** ironer designed for the housewife, is essential equipment for any Home Economics Department for two reasons:

1. It instructs the pupils in the best up-to-date method of ironing in the efficient home kitchen.
2. It accomplishes necessary ironing work of the department—such as the pressing of seams, dresses, etc., in the sewing room, and the ironing of towels, napkins, etc., used in the department or in the school building as a whole.

IRONRITE Turns Ironing *Day* Into Ironing *Hour*

Study the drawings on this page. With an Ironrite, the housewife in the home, or the pupil in the school, sits down as she irons, maintaining natural, erect posture; and she accomplishes the job in a small fraction of the time required by hand ironing.

Ironrite chair gives correct posture when ironing

Model 75 with porcelain top of convenient table height

IRONRITE Advantages

Ironrite is the only ironer with double open-end roll and pointed shoe that DOUBLES IRONER USEFULNESS, which, together with the following **exclusive** features, make Ironrite the easiest of all ironers to use!

1. "Over the shoe" ironing, using points—not garment against cloth.
2. Correct application of heat—underneath—steam rises.
3. Central support of both roll and shoe—non-sagging—insuring even pressure.
4. Stationary forming board—guiding garments and permitting easy shifting.
5. Knee pressing control—drying seams without removing hands from garment.
6. Steam and moisture vent—at rear of roll—away from operator.
7. Cast iron shoe—which holds and distributes heat evenly.
8. Uniform balanced pressure—no springs to adjust.
9. Correct ironing position—non-tiring posture.
10. Automatic clutch with dual knee control.
11. Automatic rear brace for cabinet prevents accidents.
12. Sheen action—irons nap same way on each repeat.

Plus These Improvements

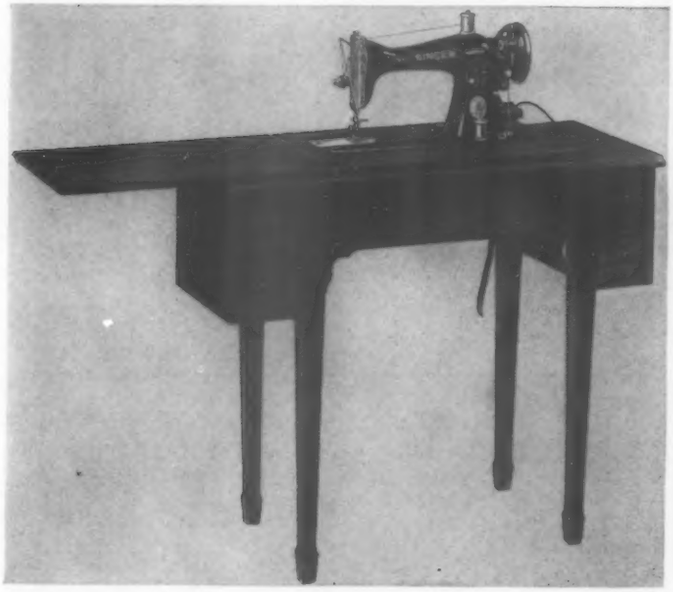
13. Selective heat control—irons faster and cheaper than "divided shoe."
14. Sturdy construction with finest materials—this insures long life.
15. Automatic free-wheeling roll on oilless roller bearings.
16. Convenient lapboard—which protects the operator from damp garments.
17. Self-lubricating mechanism.
18. Pilot light shows when heat is on.
19. Porcelain table-top cabinet—protects against dust.
20. Baked Dulux finish.

SINGER SEWING MACHINE COMPANY

149 BROADWAY, NEW YORK, N. Y.

Consider this when planning your sewing rooms—

90% of all schools and colleges are equipped



Special discounts to schools! Singer offers attractive savings to schools and colleges, on all sewing equipment, parts, and supplies. This sturdy Student Model Electric is a favorite with schools because of its dependable construction and trouble-free service.

We know specifications! Let us help you plan the equipment you'll need, your seating arrangements, etc. From long experience, we've compiled much helpful material in this line. Mail coupon for *free* folders on installations and specifications. There is no obligation.

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with *Singer*

FOR 7 GOOD REASONS:

1. Singer Sewing Machines have stood the test for over three quarters of a century—far longer than any other make.
2. All Singer models are designed and constructed to meet the exacting demands of the expert and stand abuse from the beginner.
3. Most *families* have Singers. The girls learn on the same kind of machine they use at home.
4. Singer offers a *free educational service* to schools and colleges.
5. No charge for inspection and adjustment service. Discounts on parts and supplies.
6. Prompt repair service from your local Singer Shop.
7. Singer gives special school discounts.

Free Replacement Program. As every business firm knows, a sensible Replacement Program is the only way to get new equipment, without unbalancing the budget. Singer has helped many schools with free surveys and a replacement schedule. Our services are yours—free of charge.

FREE! 2 PLANNING FOLDERS!

Singer Sewing Machine Company
Educational Department, Room 735
149 Broadway, New York

Please send me free copies of (1) Folder of Installations (2) Folder of Specifications.

*Name*_____

Address _____

*City*_____ *County*_____ *State*_____

EXCEL METAL CABINET CO., INC.

101 Park Avenue, New York

EXCEL METALCRAFT

Steel Kitchen Furniture for the

School Homemaking Department

THERE is no reason why a modern school building, properly built of high-grade materials, should not last a lifetime. When equipping that building, or **any** school building new or old, is there any real economy in buying low-grade, lightweight furniture—furniture that will require **constant repair** and **frequent replacement?**

Considering the fact that school furniture is subjected to the hardest kind of usage, such as active youngsters know so well how to give (!)—the equipment that will **stand up** under this constant wear-and-tear and **last indefinitely** is the only truly economical equipment.

Excel METALCRAFT kitchen equipment will give your schools a **lifetime of service.** Each well-designed, doubly strong piece of Excel METALCRAFT equipment will prove **by far the most economical in the long run**—and the first cost will be found to be as low as possible consistent with maintenance of the highest standards of sturdiness and durability.

The services of our staff are available to architects and school officials for assistance in the planning and equipping of homemaking departments. **Write to us.**

Installation of home-making equipment in Lawrence High School, Lawrence, Long Island, N. Y. Lawrence J. Lincoln, Architect

BACON and VINCENT COMPANY, Inc.

One Ellicott Street

Buffalo, N. Y.

Creating Home Kitchen Atmosphere

BAVINCO

Designers Are

PIONEERS

in the development of equipment patterned to bring the atmosphere and spirit of the home kitchen into the school or college Home Economics Department. The now universally accepted Unit Kitchen was introduced originally by BAVINCO. Our designers, working exclusively on home economics equipment for both food and clothing centers, are continually developing new ideas on matched furniture units for this highly specialized field.

BAVINCO Unit Systems make the remodeling of old departments a simple task—by adding a few units at a time. Let the BAVINCO Planning Department show you how this can be done over a period of years.

BAVINCO EQUIPMENT

BACON & VINCENT CO., INC. · BUFFALO, N.Y.

EXPERIENCE — THE GREAT TEACHER

Years of specialized study of Homemaking and Home Economics teaching programs have established BAVINCO Planning Service as the school architect's and home economist's closest adviser on furniture-equipment problems. The hundreds of BAVINCO-planned departments now time-tested and proved correct in every detail of planning as well as being thoroughly satisfactory from the standpoints of durability and attractiveness, are assurances that BAVINCO specialists are competent to plan departments to meet all conditions, and that BAVINCO equipment is adequate to meet every requirement.

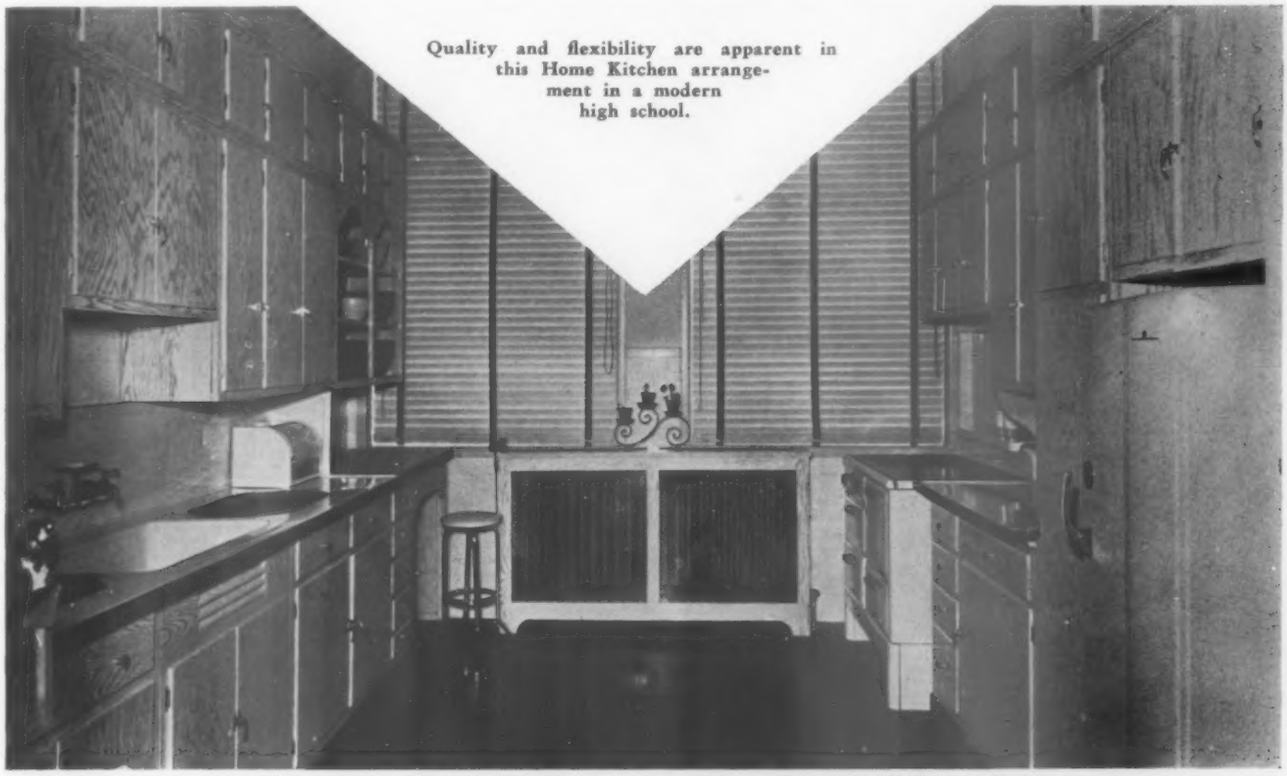
Foods Center End . . . . and . . Living-Clothing Center End, Same Room

A smaller-than-standard-size recitation room in an old school was converted into a complete modern Homemaking Department by BAVINCO Planning. The compactness of BAVINCO Units made the change possible. Years later, the same equipment was moved into a new school building and, by the mere addition of some new matched units, a larger department was economically established.

Large Unit Kitchen Food Centers in high schools and colleges (see also illustration on preceding page) are easily planned with matched furniture units in attractive home arrangements to meet each teaching requirement. BAVINCO experience in planning such rooms is nationally recognized. The flexibility of sink units and cabinets has been developed over years of experience in Home Economics equipment service.

BASIC UNITS

To meet a wide variety of conditions, **flexibility** is obtained by BAVINCO'S large line of base cabinets in many lengths, each size having drawer and cupboard arrangements designed for a particular use—pupil working station, sink cabinet, laundry, general storage, linen storage base cabinets, etc. Wall and upper section cabinets are designed in many styles and sizes to fit over bases, sinks, refrigerators, ranges, etc., to fit all requirements. Apron, broom, shelf and towel-dryer utility cabinets and divider cases complete the necessary flexibility.



Quality and flexibility are apparent in this Home Kitchen arrangement in a modern high school.

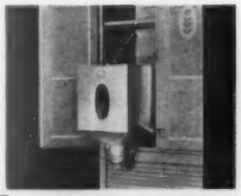
Economy is obtained because experience has established definite unit arrangements as standards. By this standardization, high quality of workmanship and of the finished product is obtained at least expense.

Automatically Extending Base Shelf — and Sliding Second Shelf

PRACTICAL CONVENIENCES MODERN

Shown here are but a few of the many features of advance designing for convenience and durability, and attractive appearance characteristic only of

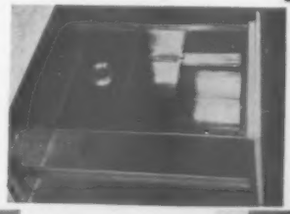
BAVINCO HOME ECONOMICS EQUIPMENT

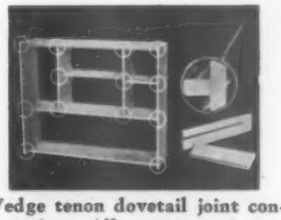


Removable Lowering Flour Bin in upper sections (optional)

Suspension Guided Drawers—Easy Operation — Always Dustproof ←

Metal Bread and Cake Drawer — in optional base arrangements →





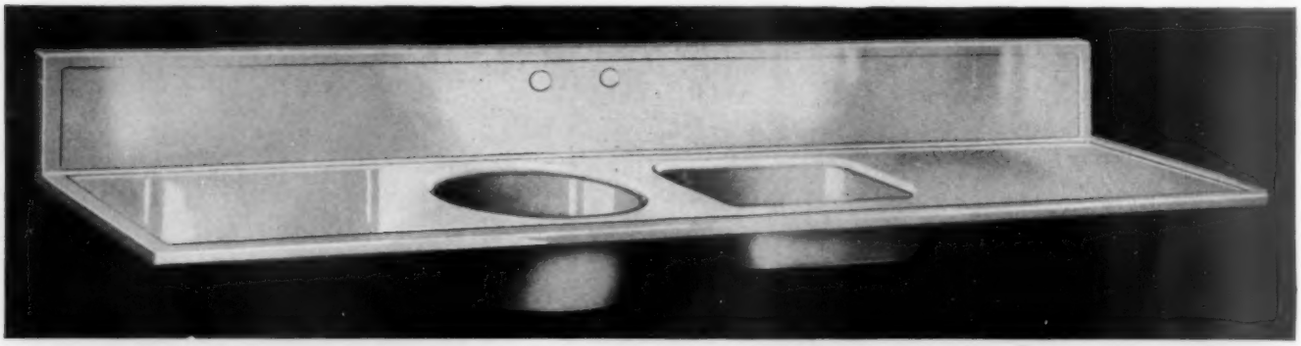
Wedge tenon dovetail joint construction—All upper sections—Permanency assured

Drawer step—For ease in reaching high shelves (optional)

Inner-Grid Door Construction—A precaution against warping—Dustproof

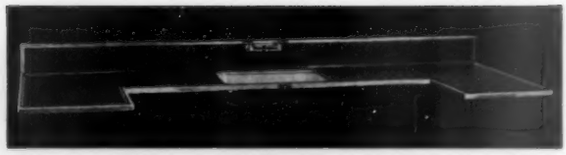
THE SINK UNIT — Center of Activity — Key to Compactness

For permanency of Cabinet Sink Tops, careful selection of proper materials and construction is highly essential. Materials must be chosen that can be fabricated in any size and shape, that will stand years of use and abuse, that will not stain with food acids, etc. The construction must be such that it will not be affected in any way by constant dampness, by the heat of ranges and of cooking utensils, nor by sudden changes of temperature. BAVINCO materials and construction are time-proven and only those which do meet these rigid requirements are used.



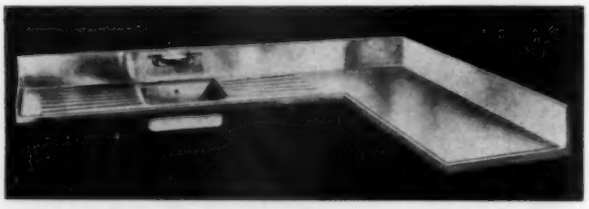
PORCELIRON

To the heavy raised edge steel top of any size, with its integrally assembled sink bowls, back and end splashers as required, are fused the coats of highest grade Porcelain Enamel (in beautiful colors or color combinations if desired). Thus the construction is water-tight and sanitary. Porceliron is stainless, easy to clean and withstands heat of cooking utensils. It is insulated to reduce noise. Cabinet tops of Porceliron are also available without sink bowls.



LINOLEUM AND MICARTA

Recommended only on sheet steel top, insuring permanent construction. Available in many colors, with Porcelain Enamel, Stainless Steel or Monel Metal bowls of various sizes. Fabricated for integral "L" and "U"-shaped installations with back and end splashers as required. Stainless Steel trim and raised edges. Both materials are very durable. Cabinet tops of either of these materials without sink bowls are also available.

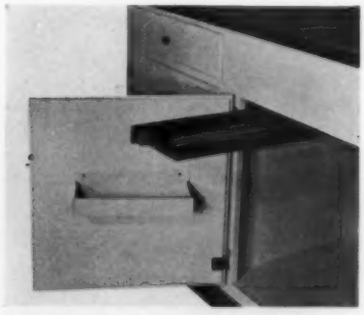


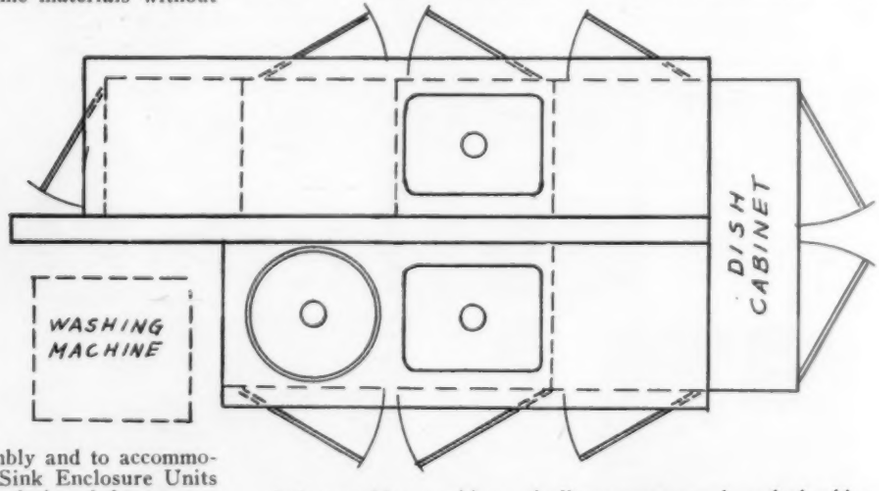
STAINLESS STEEL AND MONEL METAL

Recommended with fabricated construction of 14-gauge steel plate bonded to 20-gauge stainless steel sheet, with seamless die drawn 18-gauge bowls. Fabricated in all sizes and for "L" and "U"-shaped installations. By flat polishing at the mill to No. 4 finish, a beautiful and durable surface finish is obtained. Cabinet tops of same materials without sink bowls are also available.

COMPACTNESS

The compactness of BAVINCO Equipment allows definite use of every inch of space. This floor plan shows clearly how three 24″ cabinet bases, one 24″ and one 51″ sink enclosure unit, one 48″ divider case unit, one 24″ laundry cabinet base, one cabinet sink top 96½″ x 25″ with 16″ x 22″ sink bowl, one cabinet sink top 75″ x 25″ with one 16″ x 22″ sink bowl and one 18″ diameter laundry tray sink bowl, one clothes-washing machine and all necessary panels and plumbing fixtures can be made ideally workable in a space only 4½ feet wide by 10 feet long. Many such compact assemblies feature the planning of BAVINCO Home Economics departments.





SINK ENCLOSURE UNITS WITH SINK ACCESSORIES

To conceal the sink bowl and plumbing within the cabinet base assembly and to accommodate the very handy sink accessories, Sink Enclosure Units are used. Made in any required size, designed for correct ventilation and regularly equipped with sink utensil tray and extension towel rack, they may be arranged to accommodate the waste receptacle as an optional feature.

BAVINCO PORTABLE FOODS EQUIPMENT

is designed and made with heavy duty construction specially for Home Economics Departments.

At left — No. 380 Two-Pupil Working Station Base—Drawers extend automatically with top 48″ x 25″ unextended

At right—No. HE Special Junior. Two-Pupil Working Station low height Homemaking Cabinet, 48″ x 25″ unextended

REFECTORY TYPE UNIT KITCHEN TABLES

No. 3840 with Porceliron Top
—Closed 40″ x 25″ (as shown)
—Extended 40″ x 45″

For Food Preparation, Service and Class Work

No. 40 with Porceliron Top
—Closed 32″ x 42″
—Extended 32″ x 66″

WORK TABLE

No. 3848 Two-Pupil Working Station 48″ x 25″
Casters and lower shelf optional

TEACHER'S PLANNING DESK

No. 40-D

For Foods, Clothing or Living Centers. Size 25″ x 42″, with letter-size filing drawer, recipe-cards filing drawer, cutlery or standard desk drawer, kneehole desk drawer and writing slide. Top of wood or material to match other equipment (illustrated with Porceliron top)

GENERAL UTILITY CHAIR

No. BV-38 Ladder back home style but of heavier construction. Designed and finished for both Foods and Clothing Centers with correct posture and classroom features

ADDITIONAL ITEMS

Service Carts; Condiment Sets; Wall Clothes Dryers; Gas and Electric Ranges; Refrigerators; Cabinet Clothes Dryers, Washing Machines and all accessories.

BAVINCO MODERN STYLING OF MATCHED UNITS

For Complete Homemaking Centers and Clothing Departments

The BAVINCO system of individual, interchangeable drawers or boxes from any sewing case compartment into any table compartment, has greatly lessened the usual confusion in handling large sewing classes, and provides adequately for each individual pupil's sewing supplies and materials. BAVINCO planning solves each problem, from that of the large college sewing laboratory to the problem of the smallest homemaking center, providing home-like surroundings plus the necessary storage equipment.

Group of perfectly matched equipment—possible only when all items are planned for and furnished by one manufacturer

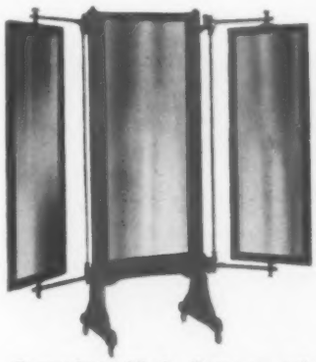
Homemaking Education Center with home-like arrangement using BAVINCO general storage, garment hanging, illustrative material and student box cases with triplicate mirror arrangement on door interiors

A COMPLETE DEPARTMENT OR A SINGLE PIECE OF EQUIPMENT

Mirrors and Fitting Stands
All styles of triplicate and single portable mirrors, also wall types and single or triplicate mirrors integral with the clothing cases. Fitting stands to match.

Homemaking Center Screens
Portable types with double-faced panel surfaces of bulletin board, blackboard or prestwood; also folding type screens.

Ironing Board Case
Can stand separately or in battery of large cases. Improved design, especially adapted for Home Economics rooms.



Complete Unit System of Sewing and Clothing Cases—interiors designed for all specific purposes

Sewing and cutting tables in many styles and arrangements—various materials for tops and drop leaves — any size and height

Strong — FOLDING FURNITURE FOR HOMEMAKING EDUCATION CENTERS **— Durable**

No. 3237 Chair Opened

No. 10W Table—Opened but not extended; size 30½" x 30½" x 29¼"

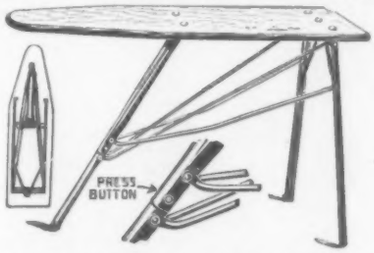
No. 10W Table—Fully extended, size 52½" x 30½" x 28½", wood top illustrated; also with leatherette top

No. 10W Table — Folded

No. 3237 Chair — Folded

BAVINCO Planning Includes

Sinks for Dyeing
Gas or Electric Clothes Dryers
Washing Machines
Ranges, Hot Plates, etc.



No. 1554 Folding Ironing Table—Folds within itself—size 15" x 54"

— Other BAVINCO Items —

Teachers' Desks—regular types
Planning Desk—No. 40-D
General Utility Chair—No. BV-38
Clothes Dryers, Cases, etc.

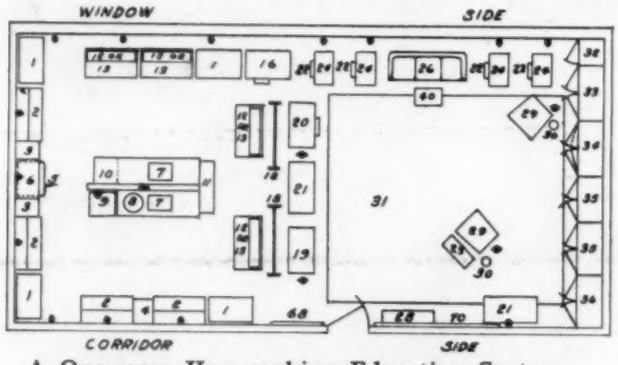
STEPS IN PLANNING A HOME ECONOMICS DEPARTMENT

Let ONE source be responsible for ALL details of your new or remodeled rooms. Send us a floor plan of the room or department showing inside dimensions, locations and sizes of all windows, door openings, heating units, exposed pipes, etc.—all fixed items with which new equipment must not interfere. Send this plan as soon as the actual room size has been determined—BEFORE any plumbing for sinks or ranges has been located, and BEFORE any built-in clothing and storage cases have been planned for in the general building contract. State grade of school, maximum number of pupils to be accommodated **per class** and **total,** and desired use of rooms (Foods, Clothing, Living Center, etc.).

Our Drafting Department will then draw up suggested equipment layouts showing all (roughing-in) plumbing dimensions, electric outlet locations, blackboards and bulletin boards, cabinets, cases, sinks, ranges, refrigerators, tables, etc., in detail elevation drawings as well as floor plan, and return them for your approval. We will also suggest plans for remodeling your present older Home Economics Center, this remodeling to be carried out over a period of time if necessary.

If you will consult your nearest BAVINCO equipment distributor, he will gladly discuss your planning problems with you—or write us, and we will have our representative call upon you.

THREE OF THE HUNDREDS OF DEPARTMENTS DESIGNED BY BAVINCO

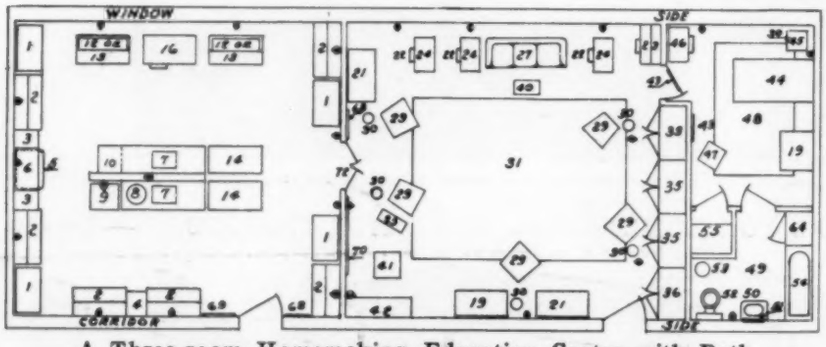


A One-room Homemaking Education Center
Size 22′ x 45′

KEY TO TYPICAL PLANS

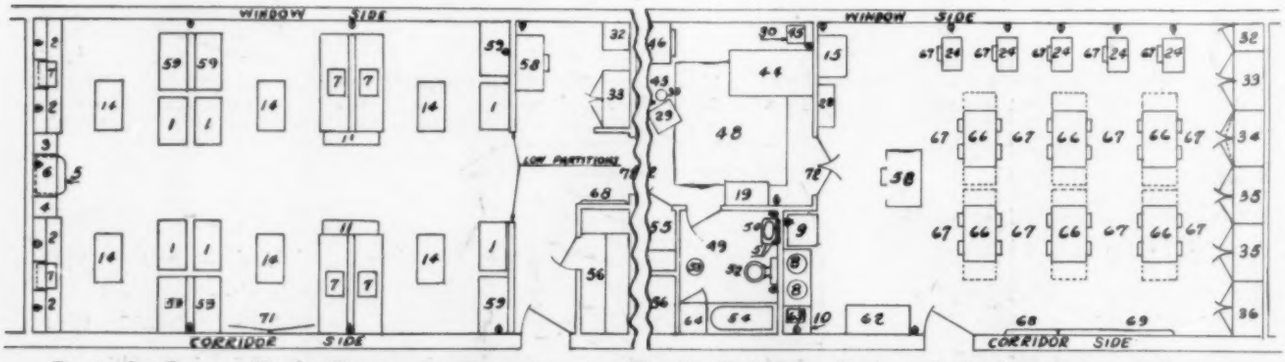
1. Stove—Gas or Electric
2. High Cabinet
3. Shelf Utility
4. Broom Utility
5. Refrigerator
6. Cupboard Over Refrigerator
7. Cabinet Sink Assembly
8. Laundry Tray with Cover
9. Clothes Washing Machine
10. Laundry Storage Base
11. Low Dish Cupboard
12. Cabinet Base—Portable
13. Low Height Cabinet—Portable
14. Foods Table—Stationary or Refectory Top
15. Reading Table
16. Planning Desk and Chair
17. Hanging Book Shelf
18. Portable Screen
19. Chest of Drawers
20. Living Room Desk and Chair
21. Living Room Drop Leaf Table
22. Living Room Side Chair
23. Secretary and Chair
24. Sewing Machine
25. End Table
26. Guest Bed or Studio Couch
27. Davenport
28. Book Shelves
29. Upholstered Chair
30. Lamp—Floor or Table
31. Living Room Rug
32. Clothing Case—Teacher's Locker
33. Clothing Case—Illustrative Material and File
34. Clothing Case—Garment Hanging and Triplicate Mirror
35. Clothing Case—Individual Compartments or Boxes
36. Clothing Case—General Storage
37. Refectory Table and Chairs
38. Side Board
39. Welch Cupboard
40. Coffee Table
41. Juvenile Table and Chairs
42. Juvenile Garment Case
43. Full Length Mirror
44. Bed
45. Bedside Table
46. Dressing Table and Bench
47. Bedroom Side Chair
48. Bedroom Rug
49. Bathroom Rug
50. Lavatory
51. Medicine Cabinet
52. Toilet
53. Bath Stool
54. Bath Tub and Shower
55. Closet—Garment Hanging (Rod and Shelf)
56. Closet—General Storage (Shelf)
57. Apron Storage Case
58. Teacher's Desk and Chair
59. Cabinet Base with Back Splash—Stationary
60. Kitchen Storage Case—Shelves
61. Table on Casters for Laundry and Dyeing
62. Clothes Dryer—Gas or Electric
63. Hot Plate—Gas or Electric
64. Linen Storage Case
65. Ottoman or Foot Stool
66. Sewing Table
67. Sewing Chairs
68. Bulletin Board
69. Blackboard
70. Blackboard with Wall Hanging Over
71. Blackboard—Swing Leaf
72. French Doors
73. Tea Cart

● = ELECTRICAL OUTLETS

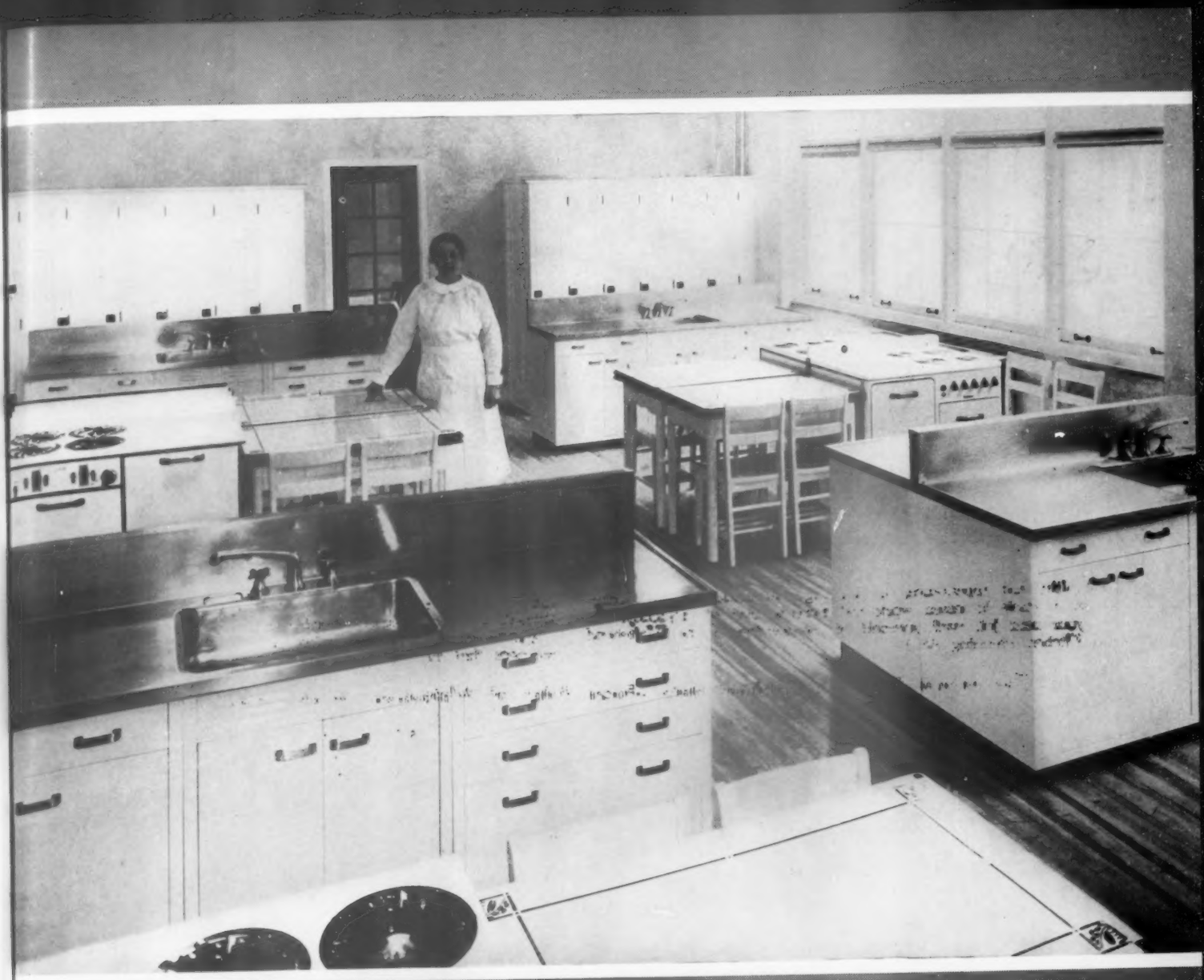


A Three-room Homemaking Education Center with Bath
Size 22′ x 60′

PORTABLE ITEMS NOT SHOWN: Folding Tables and Chairs; Ironing Board—Portable; Foods Room Chairs; Living Room Side Chairs; Dining Room and Discussion Center Chairs; Juvenile Chairs.



Part of a Larger Home Economics Department — Foods, Bedroom, Bath and Clothing Rooms shown; Dining and Living Rooms cut for Lack of Space



WHITEHEAD

WORK SAVING KITCHENS

MONEL SINKS AND
WORKING SURFACES
STEEL BASE AND
WALL CABINETS

for SCHOOL HOMEMAKING DEPARTMENTS

WHITEHEAD WORK SAVING KITCHENS

Household Division of Excel Metal Cabinet Co., Inc.

MAIN SALES OFFICE

303 West 10th Street, NEW YORK, N. Y.

FACTORY: JAMESTOWN, N. Y.

REPRESENTATIVES IN ALL PRINCIPAL CITIES

Whitehead Kitchen Planning Service

The Whitehead Kitchen Planning Staff exists solely for the purpose of serving the building trades and their customers. Architects are invited to make full use of this Kitchen Planning Service. Send us rough sketches of any kitchens you are creating, with some indication as to budget limitations. Our Kitchen Planning Staff will study them and submit finished drawings to you, complete with bills of materials and every detail worked out for construction. There is no charge for this service.

You can rely on Whitehead Kitchen Planning. It embodies all the important factors which enter into the make-up of the modern work-saving kitchen—the elements of sound construction, of design based on experience, of materials selected for serviceability and appearance, of planning that integrates the kitchen as a whole to lessen work and increase over-all efficiency. On your next job avail yourself of the services of the Whitehead Kitchen Planning Staff.

What Is a Whitehead Work Saving Kitchen

It is a combination of modern appliances with appropriate cabinet space and work surfaces—the whole planned and placed to save time, constructed to prevent annoyance.

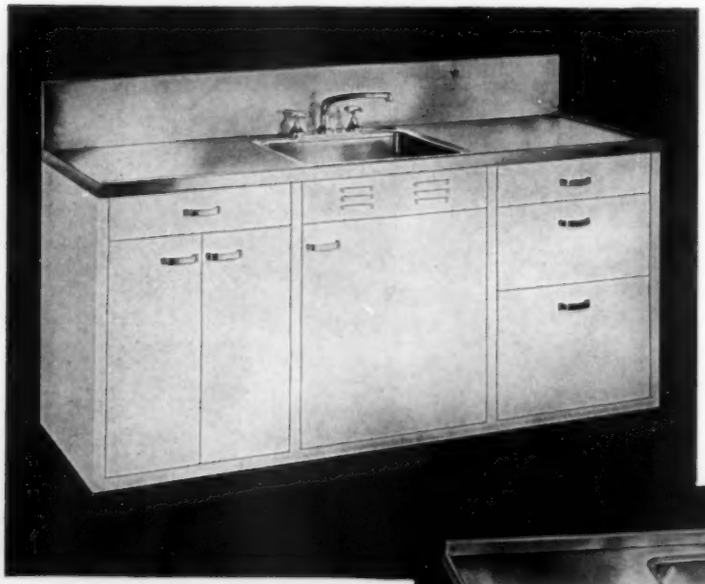
Whitehead equipment comprises four basic units—the solid Monel sink, the steel base cabinets, the steel wall cabinets and the Monel work surface. These units are manufactured in various lengths that can be assembled in combinations to fit any given space.

For making rows "come out even," Whitehead includes fillers—small dividers of steel finished the same as the cabinet assembly. Utilized between cabinets they form an unbroken cabinet line and make the assembly fit to the exact inch.

All of this individuality sounds like expensive luxury. But such is not the case. For while a Whitehead kitchen is custom planned, it is not custom manufactured.

And—a highly important point—*materials that will not wear out* mean that the first cost is the last cost.

The Monel Sink and Cabinet Unit—Focal Point of Whitehead Work Saving Kitchens



Above: **Monel Single Bowl Sink and Steel Base Cabinet Combination**
Shown with 7⅝-in. back

Right: **Top View of Monel Double Bowl Sink**
Shown with 1⅛-in. back

The sink is the kitchen's most important single piece of equipment. The Whitehead Sink is made of solid Monel because Monel is practically immune to wear and tear, combining extreme durability with the strength and toughness of structural steel. Monel is rustproof and resistant to all food acids and alkalis normally found in the home. Monel is solid all the way through, not a coating, with nothing to crack, chip or wear off.

The Whitehead Sink features a single-piece top construction with integrated backsplash—convenient pedestal faucet—flared bowl to prevent collection of water—rounded bowls with concave bottoms—all resulting in a surface easy to clean and free from crannies or cracks.

The Whitehead Cabinet is of highest grade furniture steel which weather cannot warp or swell to cause sticking drawers and doors. Features include antifriction drawer slides—insulated door and drawer fronts—recessed toe space—concealed hinges—bullet catches—rubber bumpers—welded frames, door and drawer corners—modernistic hardware.

Specifications—Whitehead Monel Sinks (25-Inch Series)

Gauge—Shall be Monel: 19-gauge USS (.043 in.) for bowls and 20-gauge USS (.037 in.) for drainboards (reinforced with steel) and back splashers.

Assembly—One-piece (single or double, specify which) bowl shall be welded to adjacent drainboards and sealed with matching solder on inside flange. Welds shall be invisible, solid and finished to perfect smoothness. Back splashers shall be integral with deck (specify either 1⅛ or 7⅝ in. high). Bead or front and side rims shall be ⅛ in. high.

Reinforcing—Entire length of sinks shall be reinforced with Z-shaped steel angle braces. Sink decks backed up with 16-gauge USS (.062 in.) steel plate bonded to underside of Monel. 16-gauge USS (.062 in.) steel channels running from either side of bowl to ends, are part of under construction with no wood construction used.

Sound-Deadening—Entire underbody shall be thoroughly coated with special compound to seal and soundproof all surfaces.

Design—Drainboards shall afford maximum work surfaces. Drillings through deck to accommodate pedestal faucet. Flare 1 in. wide, ¼ in. deep around bowl shall be provided.

Finish—All visible surfaces of sinks shall have satin finish.

Strainer—Crumb cup strainer and basket of Monel shall be supplied.

Faucet—Pedestal type faucet shall be supplied.

Note: For base cabinet specifications, see next lefthand page

Monel Sink and Steel Base Cabinet Combinations

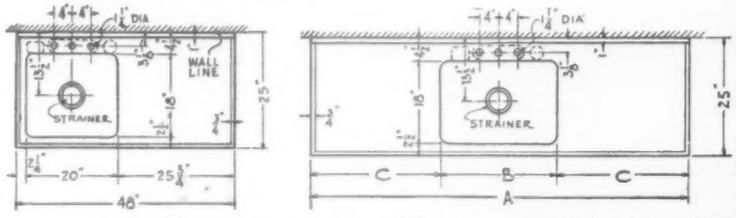
All sinks are available without base cabinets. When ordering sink alone, omit prefix PK.

Diagrams show standard models only. Intermediate sizes and combinations are available at slight extra cost.

Sinks available with 7⅝ or 1⅛-in. back splashers. Please specify. Sinks available with one or two end splashers if desired. Pedestal type faucet and crumb cup strainer with Monel basket, standard equipment.

Single Bowl Models—25-In. Wide Series

Model No.	Over-all A	Sink bowl B	Drainboards C
PKC 2048L	48″	20″	25¾″
PKC 2048R	48″	20″	25¾″
PKC 2060	60″	20″	20″
PKC 2072	72″	20″	26″
PKC 2584	84″	25″	29⅛″
PKC 2596	96″	25″	35⅛″
PKC 25108	108″	25″	41⅛″
PKC 25120	120″	25″	47⅛″
PKC 25132	132″	25″	53⅛″
PKC 25144	144″	25″	59⅛″
PKC 25156	156″	25″	65⅛″
PKC 25168	168″	25″	71⅛″

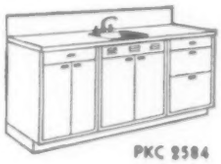


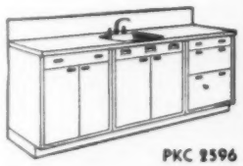
All sinks are 25 in. wide and 36 in. high when assembled with cabinets and recessed subbase. Suffix L or R signifies left or right drainboard.

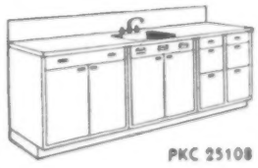
PKC 2048R

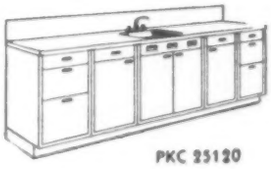
PKC 2060

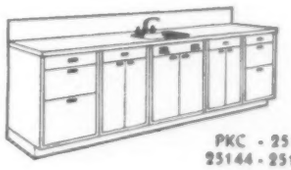
PKC 2072

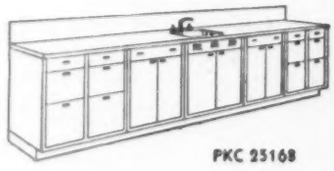

PKC 2584


PKC 2596


PKC 25108


PKC 25120

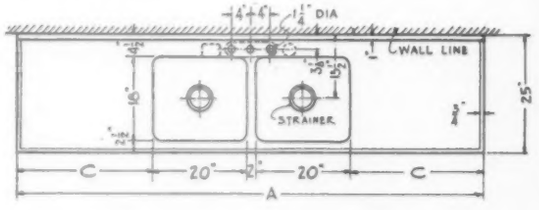

PKC - 25132
25144 - 25156

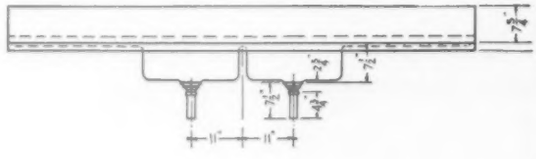

PKC 25168

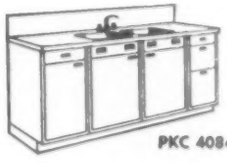
Double Bowl Models—25-In. Wide Series

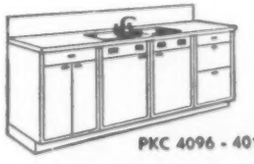
Model No.	Over-all A	Sink Bowls B	Drainboards C
PKC 4084	84″	20″ each	21″
PKC 4096	96″	20″ each	27″
PKC 40108	108″	20″ each	33″
PKC 40120	120″	20″ each	39″
PKC 40132	132″	20″ each	45″
PKC 40144	144″	20″ each	51″
PKC 40156	156″	20″ each	57″
PKC 40168	168″	20″ each	63″

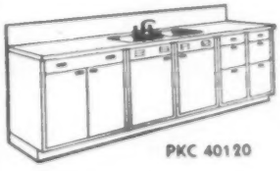
All sinks are 25 in. wide and 36 in. high when assembled with cabinets and recessed subbase.

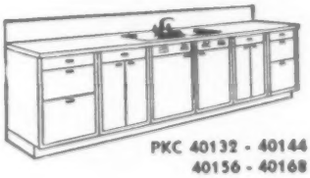





PKC 4084


PKC 4096 - 40108


PKC 40120


PKC 40132 - 40144
40156 - 40168

Single and Double Bowl Models—21-In. Wide Series

Whitehead has a 21-in. wide series of Monel Sink and Steel Base Cabinet Combinations. These are available in 41, 50, 60, 72 and 82-in. lengths and are ordered as PKWA 1041L or R (left or right drainboard), PKWA 1050, PKWA 1060, PKWA 1072 and PKWA 1082, respectively. Intermediate sizes are not available. Sinks are available without base cabinets. To order, omit prefix PK. These sinks also available with aprons for free hanging units.

25-In. Wide Models Adapted for Electric Dishwashers

Whitehead has adapted its 25-in. Monel Sinks and Steel Base Cabinets to accommodate electric dishwashers as follows:

General Electric—Sinks and Sink and Cabinet Combinations (single bowl models only) available in lengths 48, 63, 72, 84, 96, 108, 120, 132, 144, 156 and 168 in. Order sinks as GEC units and Combinations as GEPKC units. Sinks have opening for dishwasher units, cover, and large drain opening for Disposall unit. If Disposall not desired, crumb cup strainer should be ordered from General Electric Company.

Westinghouse—Sinks and Combinations (both single and double bowl) available in same sizes as Standard models in tables above. Order sinks as WC units and combinations as WPKC units. Sink decks are drilled for dishwasher inlet.

Hotpoint—All models same as Westinghouse. Order sinks as HC units and Combinations as HPKC units.

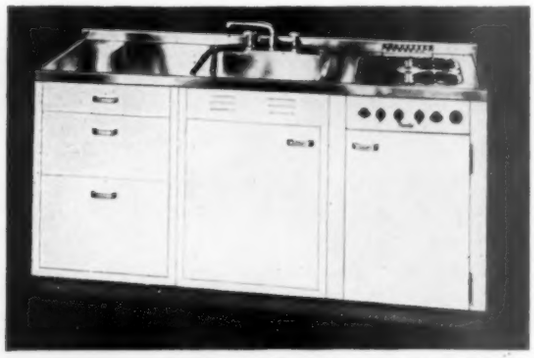
Continuous Monel Working Surfaces Integrate the Sink and All Base Units

Standard Monel Cabinet Top Shown with 1⅛-in. Back

Whitehead Kitchen Planning utilizes Monel, the accepted quality kitchen surface material, to top all base units and to integrate them with a continuous working surface. This principle, limited only by the kitchen floor plan, adds many times over to the working space and its actual value. In addition, no cracks, edges, ridges or joints can harbor grease and food particles.

Cabinet tops can be furnished in any size and shape. The Standard Tops, Cabinet Top Duocrats (complete cooking centers) and Sink Duocrats (combination sink and cooking centers), on facing page, illustrate the many arrangements possible with Monel working surfaces.

Cabinet Top Duocrat with 39-in. Range Showing 7⅝-in. Back



Sink Duocrat with 24-in. Range Showing 1⅛-in. Back

Whitehead Steel Cabinets—To Keep Things Where They Belong

Architect's Specifications—Steel Cabinets

Material—All kitchen cabinets shall be manufactured of highest grade, cold rolled furniture steel, free from rust and defects, 20-gauge throughout.

Construction—Cabinets shall be flush type with doors and drawer heads recessed between supporting stile members, 1¼-in. wide, giving an entirely smooth front. All parts of cabinets shall be spot welded. Front corners mitered, reinforced, with continuous welded joints. Top and bottom of wall cabinets to be constructed flush with lap joint.

Backs shall be recessed ⅛-in. on wall, and base cabinets, allowing wood grounds (furnished) for anchoring.

Shelves shall be of one-piece steel, flanged, removable and adjustable on 1-in. centers. Brackets for supporting shelves shall be nickel plated, and have ¾-in bearing surface.

Doors and drawer heads shall be ⅛-in. thick of double wall construction, flush both sides and filled with sound-absorbing material.

Drawers in base cabinets shall be equipped with anti friction, single bearing slides, with suspensions of 16-gauge hardened steel.

Drawers in base cabinets shall be constructed to accommodate such accessories as bread boxes, flour bins, etc. All drawers equipped with positive stop and both doors and drawers with rubber bumpers.

Optional—Wall cabinets may be furnished with glass doors set in rubber, in place of flush doors, at slight additional cost.

Finish—After cabinets are fabricated, all joints and welds shall be sanded and cabinets efficiently de-greased, assuring an entirely clean and rust-free base metal.

All cabinets shall be sanded before prime finish coats are applied. Highest grade synthetic enamels shall be used and baked on at 300° F. producing a glossy and extremely durable wearing surface.

Hardware—Hinges shall be of concealed type with fixed stops. Pulls shall be of modernistic design. Bullet catches shall be supplied at both top and bottom of all doors. Locks are available at slight extra cost.

The subbase may be of wood, tile, etc., or we can furnish a metal base—black finish, 4-in. high, set back 3-in.

Steel Base Cabinets

Whitehead Steel Cabinets make maximum use of space and increase usefulness of major kitchen appliances. Base Cabinets save steps, speed up work, by placing utensils, bulk staples, and other accessories in the *right* type of storage space within easy reach of kitchen work centers. Two styles—left, the All-Drawer type; right, the Cupboard type.

Drawers are so constructed that accessories, such as flour and meal bins, etc., may be easily inserted.

Whitehead Standard Monel Cabinet Tops are designed to fit over any combination of Base Cabinets to create a continuous unbroken work surface.

Monel Cabinet Top Duocrats

25 in. deep and 36 in. high (when assembled with recessed subbase). Length of range top opening, 17 in. Furnished with 1⅛ or 7⅝-in. back splasher, as specified. Also available with one or two end splashers if desired. Over-all tops are available without base cabinets; to order, omit prefix PK. Intermediate sizes and combinations at slight extra cost.

Standard ensembles	Over-all length	Working Surfaces Left	Right
Models with 24-in. Range (Magic Chef No. 3001-0)			
DPKCT 39L	39″	3½″	18½″
DPKCT 39R	39″	18½″	3½″
DPKCT 42L	42″	3½″	21½″
DPKCT 42R	42″	21½″	3½″
DPKCT 48L	48″	3½″	27½″
DPKCT 48R	48″	27½″	3½″
DPKCT 54L	54″	3½″	33½″
DPKCT 54R	54″	33½″	3½″
DPKCT 60L	60″	3½″	39½″
DPKCT 60R	60″	39½″	3½″
DPKCT 72L	72″	3½″	51½″
DPKCT 72R	72″	51½″	3½″
DPKCT 72C	72″	27½″	27½″
DPKCT 84C	84″	33½″	33½″
Models with 39-in. Range (Magic Chef No. 3401-0)			
DPKCT 60X	60″	20″	23″
DPKCT 72X	72″	35″	20″
DPKCT 84X	84″	35″	32″
DPKCT 96X	96″	41″	38″
DPKCT 108X	108″	68″	23″
DPKCT 120X	120″	71″	32″

Suffix L, R or C indicates range located at left, right or center of combination.

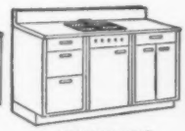
DPKCT 39R

DPKCT 42R

DPKCT 48R

DPKCT 54R

DPKCT 60R

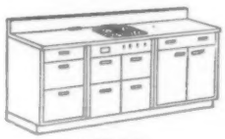

DPKCT 72C

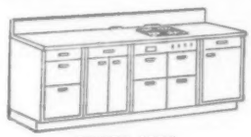
DPKCT 84C

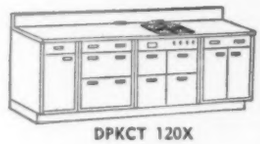
DPKCT 60X

DPKCT 72X

DPKCT 84X


DPKCT 96X


DPKCT 108X


DPKCT 120X

Monel Sink Duocrats

25 in. deep and 36 in. high (when assembled with recessed subbase). Length of sink bowl, 20 in., range top opening 17 in. Furnished with 1⅛ or 7⅝-in. back splashers, as specified. Also available with one or two end splashers if desired. Tops available without base cabinets; to order, omit prefix PK. Intermediate sizes and combinations at slight extra cost.

Standard ensembles	Over-all length	Length of Drainboard	Surface—Bowl to Range	Surface—Range to end
Models with 24-in. Range (Magic Chef No. 3001-0)				
DPKC 2048L	48″	21¼″	5¼″	3½″
DPKC 2048R	48″	21¼″	5¼″	3½″
DPKC 2072L	72″	26″	5½″	3½″
DPKC 2072R	72″	26″	5½″	3½″
DPKC 2084	84″	32″	11½″	3½″

Suffix L or R signifies range on left or right side.

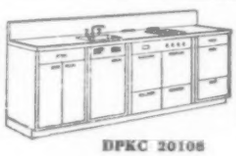
Standard ensembles	Over-all length	Surface—Bowl to Range	Length of Drainboards Left of Sink Bowl	Right of Range Opening
Models with 39-in. Range (Magic Chef No. 3401-0)				
DPKC 2096	96″	20½″	18½″	20″
DPKC 20108	108″	20½″	24½″	26″
DPKC 20120	120″	20½″	30½″	32″
DPKC 20132	132″	20¾″	36½″	38″
DPKC 20144	144″	20½″	42½″	44″
DPKC 20156	156″	20½″	48½″	50″
DPKC 20168	168″	20½″	54½″	56″

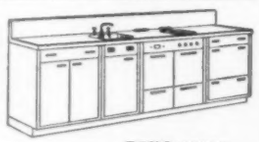
DPKC 2048R

DPKC 2072R

DPKC 2084

DPKC 2096


DPKC 20108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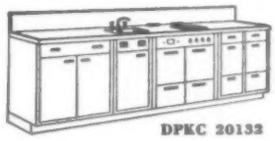
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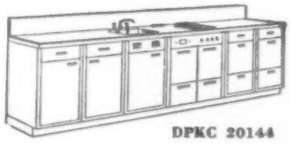
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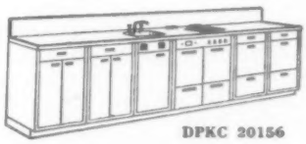
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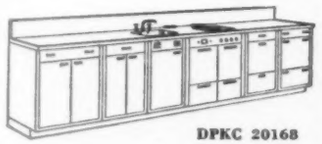

DPKC 20168

Standard Monel Cabinet Tops

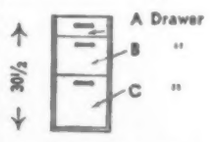
There are 14 standard lengths in Monel Cabinet Tops—15, 18, 21, 24, 30, 36, 42, 48, 60, 72, 84, 96, 108 and 120 in. Intermediate sizes and longer sizes are available at slight extra cost. Tops are 25 in. deep with flat surfaces unless specified with a bead. Height of apron, 1½ in. Available with 1⅛ or 7⅝-in. back splashers or without back splashers, as specified. Tops designed to fit over any combination of Base Cabinets to create a continuous, unbroken Monel working surface.

Steel Base Cabinets

All Base Cabinets are 24 in. deep and 30½ in. high, making an ideal working height of 36 in. when assembled with recessed subbase and Monel top.

Furnished without subbase or Monel top, unless specified. Single door units available with right or left hand hinge.

All Drawer Style



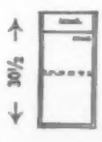
15B, 18B, 21B, 24B

Drawer Combinations in All Drawer Style can be varied at slight extra cost, such as two "A" drawers for one "B," or three "A" for one "C."

30B 36B

Cupboard Style

Cupboard style cabinets furnished with one shelf.

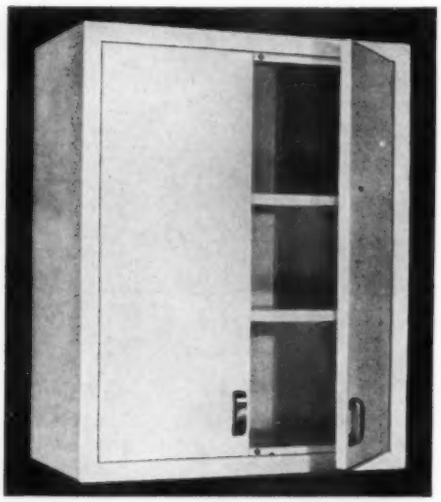


18BC, 21BC

24BC

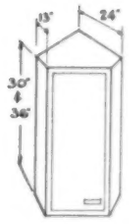
30BC, 36BC

Steel Wall Cabinets



Whitehead Steel Wall Cabinets form an integral and necessary part of all kitchen work centers. Adaptable to all sizes of canned goods and staples, glasses and dishware, these light but strong cabinets form convenient storage space directly above range, refrigerator, and sink and intermediate working surface.

Their depth of 13 in. adapts them to base units, giving free vision of working surfaces without danger of striking the head. Shelves, adjustable at ½-in. intervals, accommodate items of all sizes.



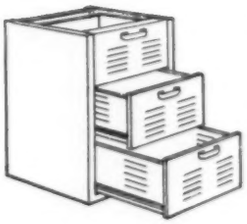
30 CWD
36 CWD

Corner Wall Cabinets

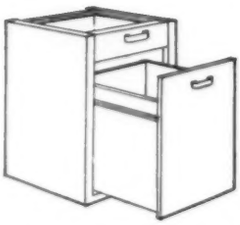
This cabinet takes full advantage of what would otherwise be wasted space. Also available without door for use as a corner niche.

Model	Width	Depth	Height
30CW	25″	25″	30″
36CW	25″	25″	36″

Steel Utility Base Cabinets



Vegetable Storage Cabinet



Soiled Linen Cabinet

Model	Width	Depth	Height
Vegetable Storage Cabinets			
21VS	21″	24″	30½″
24VS	24″	24″	30½″
Soiled Linen Cabinets			
21SL	21″	24″	30½″
24SL	24″	24″	30½″
Plate Warmer and Towel Dryers			
24TW	24″	24″	30½″
30TW	30″	24″	30½″
Dead Corner Cabinet			
BCDS	20″	24″	30½″

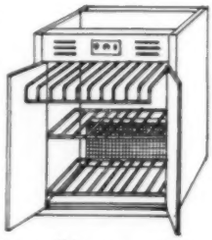


Plate Warmer and Towel Dryer

Dead Corner Cabinet

Cabinet Accessories

Tray Racks
Cutlery Trays
Bulk Storage Bins
Bread Bins
Lid Rack Partitions
Cuphook Racks
Step Shelves
Soap-Powder Racks
Refuse Containers
Towel Hangers
Cabinet Locks
Lumiline Lights

Assembly Accessories

Sink Bottom Plates
Sink Front Returns
Faucets—including hose spray and three water
Crumb Cup Strainers
Monel Sink Bowls
Steel Subbases
Steel Cabinet Fillers—
End—wall and base
Intermediate—wall and base
Corner—wall and base
Corner Base Angle

The Whitehead Junior Line—for Those with Limited Budgets

No essential Whitehead work saving feature is sacrificed in this Junior Line. Construction is simplified. A slightly lighter gauge steel is used. But the real saving is made possible because the Junior Line consists of a fewer number of pieces manufactured in larger quantities. Savings in machine work, in dies, in the economies of quantity production, of interchangeable standard parts, are passed directly along.

Where greater flexibility is necessary, it is possible to utilize Whitehead DeLuxe Steel Cabinets and Monel Sinks in conjunction with the Junior Line.

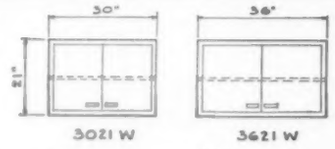
The Unacrat

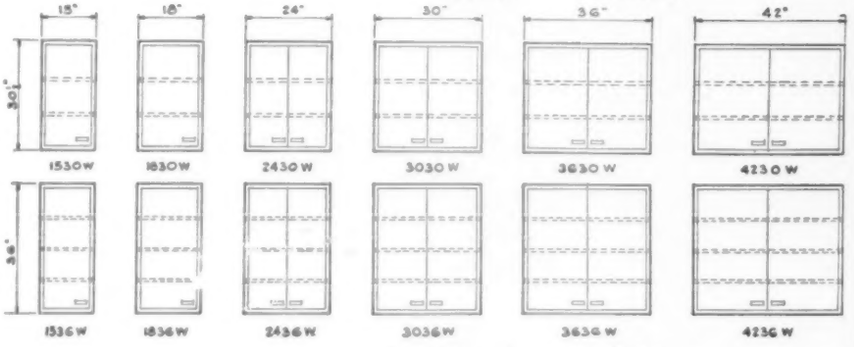
A 60-in. Monel Sink and Steel Base Cabinet Combination, known as the Unacrat, is the focal point of the Junior Line. The Unacrat, 25 in. deep and 36 in. high, has two large drawers, one cutlery drawer, two large cupboards, and under bowl usable storage space.

Steel Wall Cabinets

No.	Width	Height	Depth
3021W	30″	21″	13″
3621W	36″	21″	13″
1530W	15″	30″	13″
1830W	18″	30″	13″
2430W	24″	30″	13″
3030W	30″	30″	13″
3630W	36″	30″	13″
4230W	42″	30″	13″
1536W	15″	36″	13″
1836W	18″	36″	13″
2436W	24″	36″	13″
3036W	30″	36″	13″
3636W	36″	36″	13″
4236W	42″	36″	13″

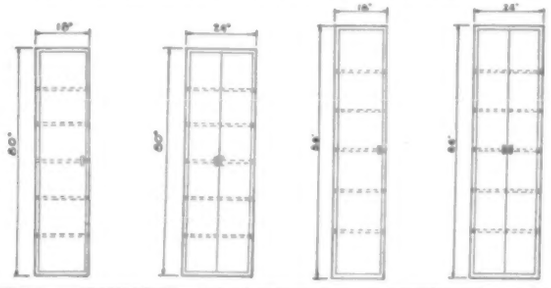
Specify left or right hinge on single door cabinets.





Steel Linen Cabinets

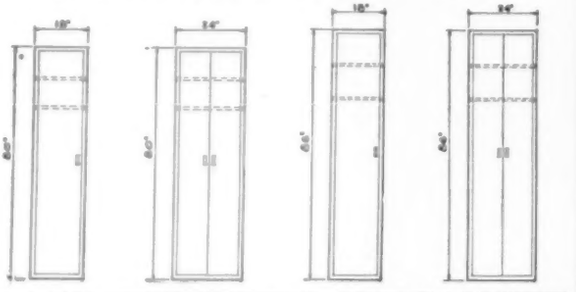
Specify left or right hinge on single door cabinets.



13″ deep..	1880TLL 1880TLR	2480TL	1886TLL 1886TLR	2486TL .....
24″ deep..	1880DYLL 1880DTLR	2480DTL	1886DTLL 1886DTLR	2486DTL .....

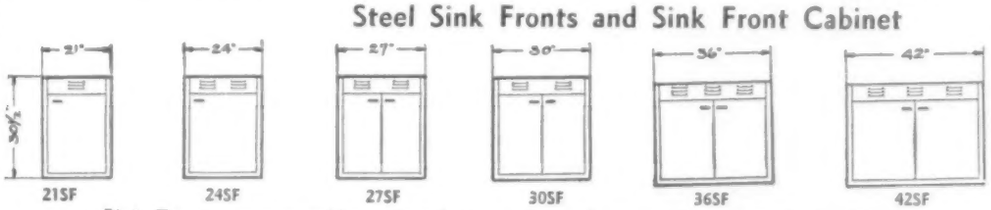
Steel Implement Cabinets

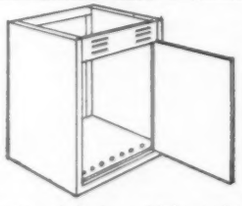
Specify left or right hinge on single door cabinets.



13″ deep..	1880TML 1880TMR	2480TM	1886TML 1886TMR	2486TM .....
24″ deep..	1880DTML 1880DTMR	2480DTM	1886DTML 1886DTMR	2486DTM .....

Steel Sink Fronts and Sink Front Cabinet

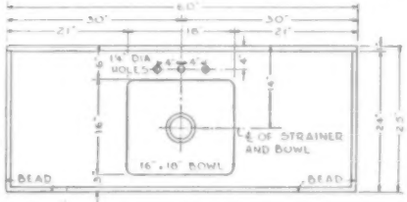




24 and 36-in. widths only. (36 in. has double door.)

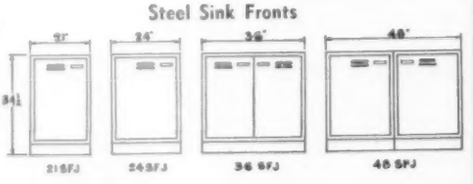
Sink Fronts are not cabinets, but fronts only, and are used to conceal plumbing

Whitehead Junior Line

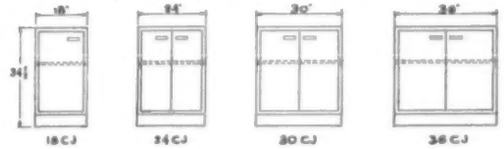


Unacrat Monel Sink and Steel Base Cabinet Combination

Steel Sink Fronts



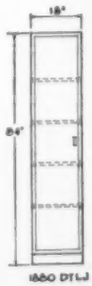
Cupboard Style Steel Base Cabinets



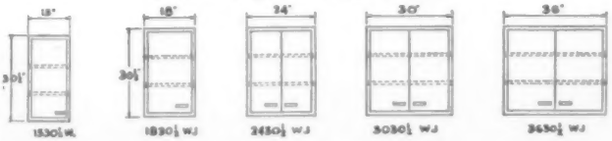
All Drawer Style Steel Base Cabinets

Steel Linen Cabinet

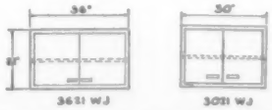
Steel Implement Cabinet

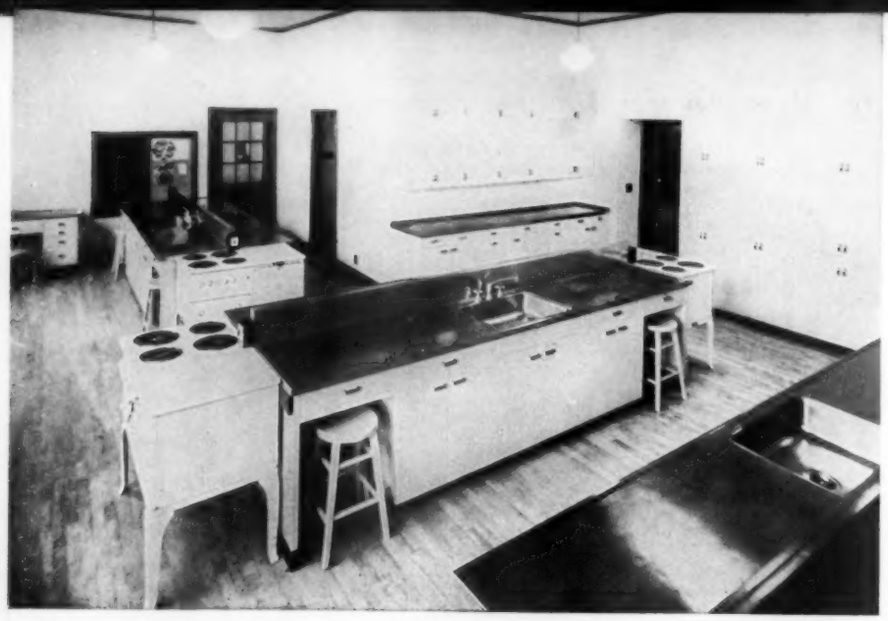


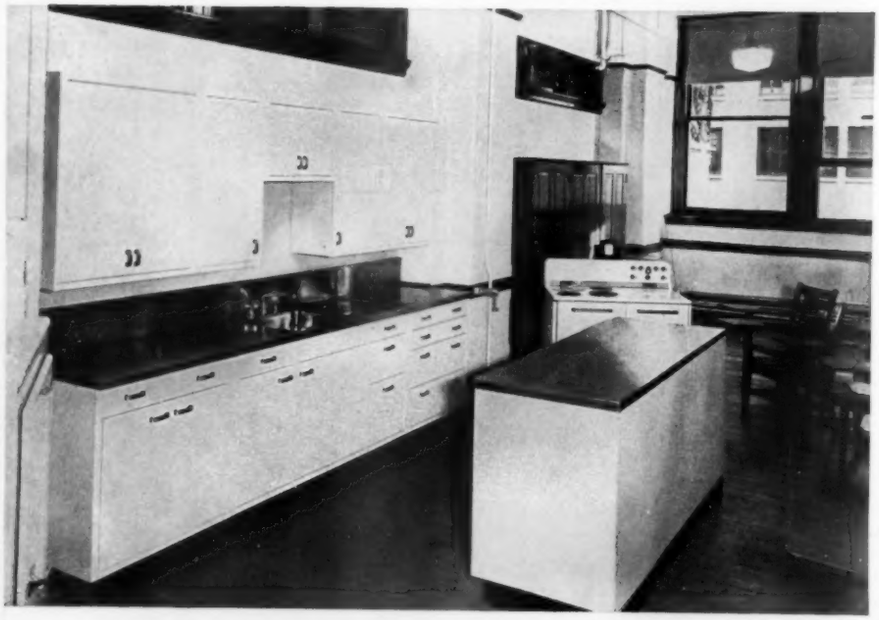
30½-in. High Steel Wall Cabinets



21-in. High Steel Wall Cabinets







For School or College Classroom or Laboratory

The Whitehead Work Saving Kitchen Units described in this folder are standard units so designed that by combining the various types and sizes almost any desired arrangement may be economically obtained. Through this standardization, cost can be kept within the budget limitations of the average school.

In designing this equipment for school homemaking and food laboratories, our aim has been to provide the highest standard of quality and the maximum adaptability to advanced educational practice.

Whitehead Monel sinks and working surfaces, steel base and wall cabinets, will efficiently fit and serve the requirements of the one teacher department of the small school, the homemaking cottage, or the food laboratories of the great metropolitan high school or college.

The services of our staff and planning department are available to architects and school officials for assistance in the planning and equipping of homemaking departments.

Adaptable to All Requirements

Whitehead units are completely flexible in application. Monel sinks and working surfaces are available in exact dimensions to provide continuous tops to fit over all units, while Whitehead steel base and wall cabinets combine with filler strips to form any arrangement of units desired for any specified space.

This flexibility permits you to work out your own ideas and plans and incorporate them into recommended typical assemblies that have proven their worth in educational experience in all sections of the country. Where special equipment is needed we are prepared to supply it, although the cost will necessarily increase.

We invite you to submit a rough sketch of your available floor space showing some idea of your desired arrangement of units in assembly. We shall be glad to submit a finished layout from your floor plan, together with complete specifications and prices, or mail the postcard inside this folder and a representative will call.

WHITEHEAD WORK SAVING KITCHENS

Household Division of Excel Metal Cabinet Co.

303 WEST 10th STREET, NEW YORK CITY—REPRESENTATIVES IN ALL PRINCIPAL CITIES

DOEHLER METAL FURNITURE CO., INC.

For Dormitory—Cafeteria—Reception Room—Infirmary

DORMITORY CAFETERIA RECEPTION ROOM
INFIRMARY CHROMIUM BEDDING

Executive Offices: 192 Lexington Avenue, New York

BRANCH OFFICE—102 Portland Street, Boston, Mass.

U. S. Naval Academy, Annapolis, Md.
U. S. Military Academy, West Point, N. Y.
University of Maryland—College Park, Md.
Miss. State Teachers College—Starkville, Miss.
Southeast Mo. State Teachers Col., Cape Girardeau, Mo.
U. S. Naval Hospital Corps. Training School, Norfolk Naval Hospital, Portsmouth, Va.
Grafton State School, Grafton, N. Dak.
Alcorn A. M. College, Alcorn, Miss
Alabama College, Montevallo, Ala.
Florida A. & M. College
Georgia State Col. for Women, Midgeville, Ga
Indiana University, Indianapolis, Ind.
Bowie State Normal School, Bowie, Md.
Smith College, Northampton, Mass.
State Teachers College, Chadron, Neb.
Naval Air Station, Cape May, N. J.
State Inst. of Applied Agric., L. I., N. Y.
Columbia University, New York, N. Y.
Skidmore College, Saratoga Springs, N. Y.
Syracuse University, Syracuse, N. Y.
Duke University, Durham, N. C.
Ohio University, Athens, Ohio.
Kent State University, Kent, Ohio.
Miami University, Oxford, Ohio.
Bryn Mawr College, Bryn Mawr, Pa.
Exeter School, Exeter, R. I.
A. & M. College, Orangeburg, S. C.
College of Industrial Arts, Denton, Tex.
Utah State Agricultural College, Logan, Utah.
Medical College of Virginia, Richmond, Va.
Theo. Roosevelt Indian School, McNary, Ariz.
Montross School for Girls, Baltimore, Md.
St. Joseph's College H. S., Emittsburgh, Md.
Howard Seminary, Bridgewater, Mass.
Gamma N of Sigma Nu, Ann Arbor, Mich.
Indian Agency (New School) Rushville, Neb.
Industrial School, Manchester, N. H.
St. Elizabeth's College, Convent Station, N. J.
School No. 18, Jersey City, N. J.
U. S. Indian School, Albuquerque, N. M.
Seton Hall College, South Orange, N. J.
Santa Fe Indian School Santa Fe, N. M.
Albion State Training School, Albion, N. Y.
State School of Agriculture, Delhi, N. Y.
State Agricul. & Indus. School, Industry, N. Y.
N. Y. State College of Agricul., Ithaca, N. Y.
N. Y. City Reformatory, New Hampton, N. Y.
Inst. for Imp. Instruc. for Deaf Mutes, N. Y. C.
N. Y. Post Graduate Medical School, N. Y. C.
Our Lady of Mercy Academy, Syosset, L. I.
Jamestown College, Jamestown, N. D.
Jane Adams School, Cleveland, Ohio
Western Reserve Academy, Hudson, Ohio
Chilocco School, Chilocco, Okla.
Eufaula Boarding School, Eufaula, Okla
School for the Blind, Huskogee, Okla.
Wheelock Academy Dormitory, Millerton, Okla
Quapaw Seneca Ind. School, Wyandotte, Okla.
The Appalach. State Teach. Col., Boone, N. C.
Kappa Sigma Fraternity, Columbus, Ohio
N. C. State Col. of Agricul., Raleigh, N. C.
Anadarke Indian School, Anadarke, Okla.
Claremore Indian School, Claremore, Okla
Indian School, Hartshorne, Okla.

They Demanded

THE BEST!

Doehler Metal Furniture

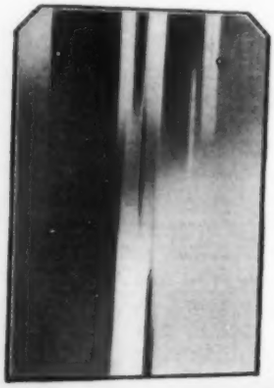
DID THE REST

Ne...
Geor... O.
Connec... nn.
Conn. Col... n, Conn.
North Georgi... Ga.
Iowa School for ... il Bluffs, Ia.
New Elementary Sch... rankford, Ky.
State School for Girls, Hallowell, Me.
Phoenix Indian School, Phoenix, Ariz.
Arkansas Train. School for Girls, Benton, Ark.
Ignacio Boarding School, Ignacio, Col.
Conn. School for the Blind, Hartford, Conn.
State Welfare Home, Smyrna, Del.
Roosevelt High School, Washington, D. C.
St. Johns College, Meridan, Conn.
Georgia School for Deaf, Cave Springs, Ga.
University of Idaho, Moscow, Idaho.
St. John College, Winfield, Kas.
Millersburg Military Inst., Millersburg, Ky.
Pownal State School, Pownal, Maine.
U. S. Coast Guard Acad., New London, Conn
Miss. State Teach. Col.—State Col., Miss.
Miss. State Teach. Col.—Hattiesburg, Miss
N. C. College for Negroes, Durham, N. C
A. & M. College, Houston, Tex.
Auburn University—Auburn, Ala.
Ball State Teachers College, Muncie, Ind.
University of Georgia, Athens, Ga.
Naval Air Station, San Diego, Cal.
U. S. Naval Air Station, Anacostia, D. C.
Bessie Tift College, Forsythe, Ga.
Abraham Baldwin Agricul. Col., Tifton, Ga.
Morehead State Teach. Col., Morehead, Ken.
Howard University, Cambridge, Mass.
...ssippi State College, Alcorn, Miss.
...ana State School of Mines, Butte, Mon.
... Teachers College, Kearney, Neb.
... Teachers College, Trenton, N. J.
...ra Reformatory, Elmira, N. Y.
...ark State School, Newark, N. J.
...cuse State School, Syracuse, N. Y.
...saic State School, Wassaic, N. Y.
... T. College, Greensboro, N. C.
...yon College, Gambier, Ohio
...yon College, Mt. Vernon, Ohio.
...es Academy, Hartshorne, Okla.
...wyn Training School, Elwyn, Pa.
...node Island State Col., Kingston, R. I.
Maryville College, Maryville, Tenn.
S. W. Tex. State Teach. Col., San Marcos, Tex.
Sweet Briar College, Sweet Briar, Va.
Polacca Indian Day School, Holbrook, Ariz.
St. Joseph's College, Emmitttsburg, Md.
District Training School, Laurel, Md.
New Eng. School of Theology, Brookline, Mass.
St. Catherines College, Minneapolis, Minn.
Laconia State School, Laconia, N. H.
Manual Training School, Bordentown, N. J.
Kingsley School, Essex Falls, N. J.
New Jersey Train. School, Little Falls, N. J.
St. Francis Hos. Sch. of Nurs., Trenton, N. J.
Union County Regional H. S., Springfield, N.J.
State Col. for Teachers, Albany, N. Y.
U. S. Coast Guard Air Station, Brooklyn, N. Y.
Agric. Experimental Station, Geneva, N. Y.
Cornell University, Ithaca, N. Y.
Florence Nightingale School, Katonah, N. Y.
Hans Hoffman School, N. Y. C.
Mt. St. Michael Academy, N. Y. C.
St. Thomas Choir School, N. Y. C.
N. Y. State Tr. Sch. for Boys, Warwick, N. Y.

WRITE FOR ILLUSTRATED CATALOGS AND COMPLETE DETAILS

•DOEHLER METAL FURNITURE FOR SCHOOL AND COLLEGE DORMITORIES

• Doehler metal furniture is truly comfortable. All metallic sounds have been eliminated, drawers always slide smoothly and easily, it never loosens, chips or cracks.



No. 6201 Dresser and Mirror

• We illustrate only a small portion of our very extensive line of stock items particularly adaptable to dormitory use.

• We manufacture a complete range of varied designs in suites and separate pieces in both the traditional period designs and the currently popular contemporary styles.

No. 509 D. S. Desk

No. 6215 Desk

This modern suite is our suggestion for your Women's dormitory.

No. 6202 Chest of Drawers

WITHOUT OBLIGATION WE WILL PREPARE BUDGETARY ESTIMATES FROM YOUR FLOOR PLANS

•FOR BEAUTY *PLUS* DURABILITY— SELECT DOEHLER METAL FURNITURE

- All products are available in both natural wood grain reproductions and in cheerful solid colors; processed with Dohlite, a synthetic enamel that is resistant to cigarette burns, hard knocks, steam heat, climatic conditions and which assures the permanence of the original attractiveness.
- Doehler Metal Furniture is superbly designed and constructed to withstand more than a normal amount of abuse without showing the slightest signs of wear.
- Each and every piece is built to give many years of steady service.

No. 514 Double Study Desk

No. 54 Easy Chair

FOR

- Dormitories
- Libraries
- Reception Rooms
- Infirmaries
- Cafeterias

No. 9128-E Bed and Spring

No. 256-1 Chair

WE OFFER

A complete line of mattresses of every type and construction at very interesting prices. Let us know your requirements and we will be pleased to recommend the proper type for your use.

No. 261 Chair

WRITE FOR COMPLETE DETAILS ON OUR LINE OF SPRINGS, COUCHES, DIVANS, COTS, ETC.

DOEHLER'S modern tubular furniture line is now available in stainless steel as well as chromium.

DOEHLER'S modern furniture is upholstered in the finest grade of duPont washable synthetic leather.

No. 1231-3 Settee

No. 1168 Side Chair

No. 1169 Side Chair

No. 1502 Pedestal Table

No. 1166 Semi-Arm Chair

- We particularly recommend the installation of this equipment in cafeterias, lounge and reception rooms, offices and meeting halls.
- Its lasting finish—sturdy and durable construction—is your assurance of many years of satisfactory usage.

No. 1131 Easy Chair

DOEHLER STAINLESS STEEL FURNITURE

INQUIRE ABOUT OUR COMPLETE LINE OF "APPROVED" INFIRMARY AND HOSPITAL EQUIPMENT

UNIVERSAL EQUIPMENT COMPANY

Institutional Furniture

Batesville, Indiana

This is an illustration of a cozy room in the girls' dormitory of a large, well-known university. The furniture is typical of the wide variety made also for dining-rooms, social rooms, libraries and other rooms by UNIVERSAL Equipment Company, Batesville, Indiana. No premium is added to the price for homelike beauty and comfort of this furniture.

Individuality IN FURNITURE
WITHOUT PENALTY IN PRICE!

Today, you can get furniture for every room just as homey and handsome as the furniture at your own fireside. If desired, you can get it designed to suit your personal tastes, and to harmonize with the architecture of your buildings, or with the interior decoration of the individual rooms. In addition, the furniture is built to retain its solid ruggedness and good looks in spite of unusually long, hard use; and its attractive color tones are maintained with special permanent institutional top coats or finishes.

THERMO-WELD CONSTRUCTION

One of the most outstanding and exclusive advantages to remember about furniture by UNIVERSAL is the Thermo-Weld construction. This is very important to you, for, by this process of bonding plies of wood together, you are assured of permanent construction, under all circumstances.

TECHNICAL ADVICE

UNIVERSAL Furniture is designed and built by master craftsmen in a large organization, famous for over seventy years—located among the hills in the heart of Indiana hard woods. It is the kind of good, good-looking furniture your students most appreciate.

LET US
WORRY ABOUT YOUR FURNITURE PROBLEMS

SIMMONS COMPANY

CONTRACT DEPARTMENT

Merchandise Mart Chicago, Illinois

Dormitory Room

The illustration above gives a clear idea of how Simmons Modern Furniture looks in a typical room setting. The sturdy construction of the Simmons steel chest makes it practically indestructible. Drawers will not stick or bind. The desk has a linoleum top, cemented on. The outside edges are secured with metal binding (which may be removed and renewed when necessary). The Simmons bed is the same type that has gained a nation-wide reputation for strength and durability.

Simmons furniture is made in a wide variety of finishes—simulated wood grains and colors. These finishes are the finest ever applied to steel. They are heat treated, flexible synthetic gum. These "Simfast" finishes were developed to resist percussion—they will not chip or flake.

Suggestion for School Infirmary

Bed H-343 **Bedside Table F-351**

Simple attractive matching styles. The hospital bed has adjustable posture bottom. Both pieces are made of steel finished in "Simfast." Sanitary. Easy to keep clean.

DORMITORY ROOM EQUIPMENT

Fine Colonial styles combined with modern, make attractive groups for dormitory rooms. Simmons steel furniture is not affected by climatic changes . . . it is finished in lasting "Simfast" . . . it is strong and sturdy enough to stand up under severe use.

F-146 Chest

Modern two-tone design streamlined into Modern American. Roomy drawer space. Top and sides insulated. Equipped with wood drawer guides. Other styles of dresser and chest available. Chest illustrated in two-tone color finish . . . Canyon Brown and Bone White.

H-352 Bed

A full panel single bed that is particularly good for a dormitory room. The band type flat spring provides the proper foundation for felt or inner-spring mattresses, combined with maximum durability and low cost.

B-950
Double Deck Bunk

Heavy 1.9″ posts. Slumber King springs. May be taken apart and used as twin beds as shown in circle.

Simmons Deepsleep Mattress

Comfortable inner-spring mattress. Built to give long and satisfactory service.

B-35 Bed

Well styled Jenny Lind bed, at a moderate price.

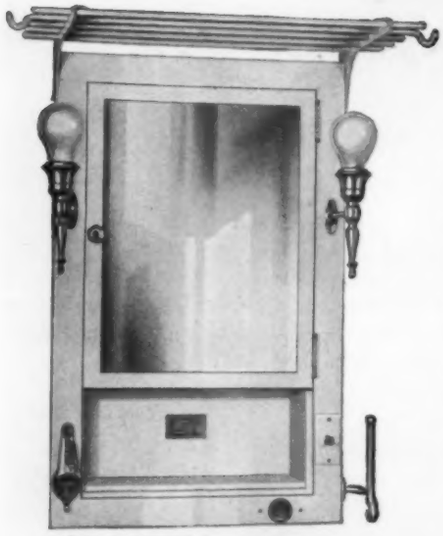
F-736 Chair

F-375 Study Desk

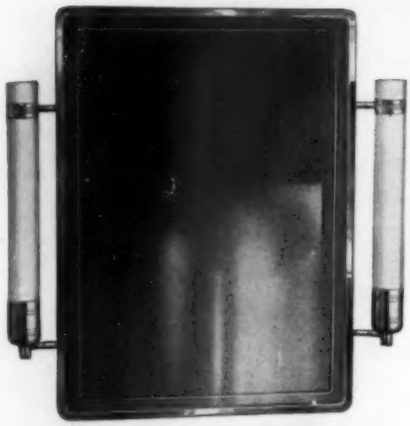
Desk equipped with one top drawer, and two shelves for books. Two-tone color finish illustrated.

Write for 1940 catalogue, suggested layouts, and budget prices.

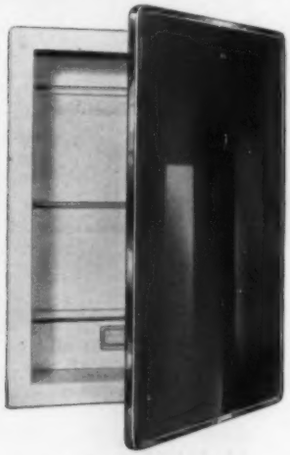
MIAMI CABINET DIVISION
The Philip Carey Company
MIDDLETOWN, OHIO



Dormitory Special



No. 1100 with Tubular Lights



Master Jr. Model

Miami Bathroom Cabinets . . .

were developed by Miami-Carey designers in cooperation with leading architects. Design and equipment are based on long experience and thorough knowledge of dormitory requirements. Thousands of these cabinets are installed in the world's leading dormitories, hotels, clubs, and public buildings. The cabinets illustrated are practical. This is a proven fact. However, if you are designing a new dormitory or remodeling an old one, the Miami-Carey organization will cooperate with you in working out your own ideas.

The list of Miami Cabinet installations include: Notre Dame, Columbia, Yale, Texas, Duke, John Carroll and many other colleges and universities. Write for catalog and complete details to Dept. AS.

DORMITORY SPECIAL

Regular Equipment: Overhead towel tray with douche bag hooks, two bronze, chromium-plated light brackets, light switch, convenience plug for electrical accessories, combination face towel and razor strop hook, used razor blade drop, three adjustable glass shelves and one white Vitrolite shelf. Cabinets are completely wired at the factory.

MASTER MODEL NO. 1100 WITH TUBULAR LIGHTS

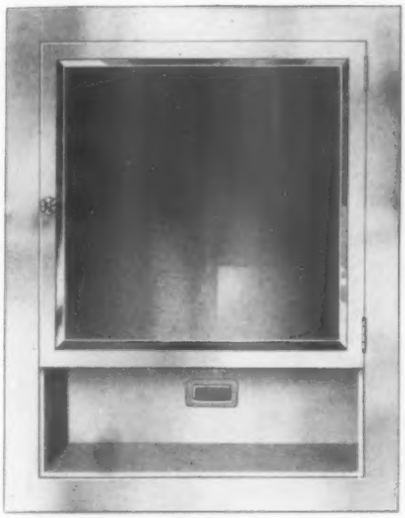
Chrome framed; no knob, hardware or portion of the body is visible. Frames are one-piece solid brass, chrome applied over nickel. Cabinet body and door back finish is Miami Crystal Snow. Heavy chromium-plated piano-type hinges, copper-backed mirror, three plate glass shelves, drop for used razor blades, tooth brush rack.

Metal parts of light brackets are brass, finished in deep, lustrous chromium. Glass shade is opal, designed to take a T-8 bulb, either 40 or 60 watt. Bulb is available at all stores that sell light bulbs. Cabinet is complete with light switch and convenience plug.

MASTER JR. MODEL

This **stainless steel** framed cabinet is recommended for the bathroom where the design is straight rather than arched or curved.

Regular equipment includes three bulb edge shelves, two tooth brush racks, used razor blade drop. Available in three sizes.



Nos. 210, 230, 240

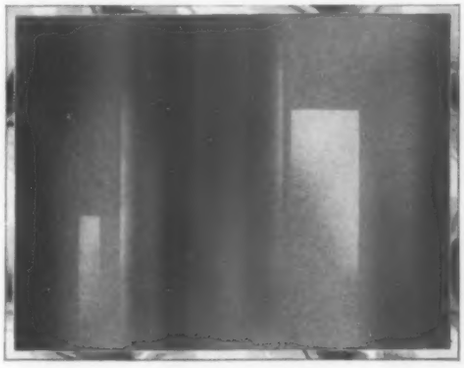
Flush Door Recessed Model Cabinets . . .

are especially recommended for the modest bathroom where price is the important consideration. They are practical in design, rugged in construction, and of a uniformly high quality.

Made from heavy gauge auto-body steel. Adjustable glass shelves, copper-protected mirrors, nickel-plated hinges, used razor blade drop, tooth brush racks. Finished in high-grade baked enamel. Bevel or plain mirrors may be had in any of these cabinets. Specify type of mirror when ordering.

No. 250

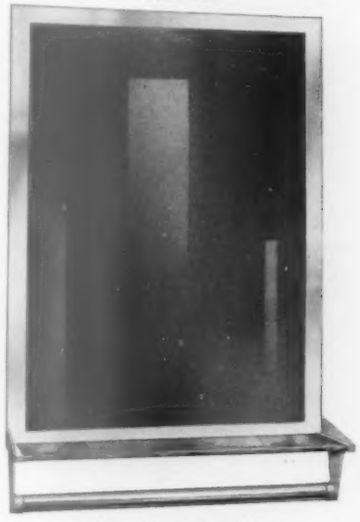
Wall Hung Washroom Mirrors . . .



Mirror No. 10

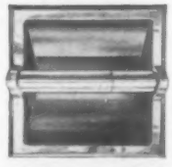
No. 907 is a white enameled steel framed mirror with towel bar and a projecting glass shelf.

No. 10 is a plain plate mirror set in a brass, chromium-plated frame, channel type. The mirror back is ARMCO steel. Mirror is No. 1 plate glass, copper protected non-electrolytically, guaranteed for five years against silver spoilage.



Nos. 907, 908, 909

No. 6001
Tumbler Holder



PAPER HOLDER
No. 6002 — Chrome Roller
No. 6003 — Wood Roller

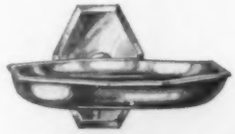
MIAMI CHROMIUM BATHROOM ACCESSORIES

Retain their beauty and brilliance through years of wear and hard use. They are made of forged brass, heavily nickeled, then covered with hard chromium. This method of manufacture assures a product that will give utmost satisfaction and retain its original brilliance. There is a Miami Accessory for every modern bathroom requirement; recessed and projection types. Easy to install—inexpensive.

No. 5014 — 3/8" x 5" x 18" Glass Shelf — Chrome Brackets

No. 5001 — 7/8" x 18" — Octagon Towel Bar

No. 5008
Tumbler and Toothbrush Holder



No. 5005—Soap Dish
No. 5006—Soap Dish with Drain Holes

THE BASSICK COMPANY

Bridgeport, Conn.

Bassick

RUBBER CUSHION FURNITURE SLIDES

Designed to allow easy movement of chairs, tables and other furniture with the elimination of all chatter and vibration and noise.

No. CG-90
⅞" Diam. Base

No. CG-91
1 1/16" Diam. Base

No. CG-92
1¼" Diam. Base

No. CG-93
1½" Diam. Base

Bassick Rubber Cushion Slides are a real necessity in class rooms and offices, etc., wherever chairs are used on hard surface floors and where the elimination of noise is desirable.

The sharp steel nail drives easily with a hammer.

The special design of the live rubber cushion with annular rings gives added resiliency and insures quietness in use.

A case hardened heavy gauge steel base with flat bearing surface provides excellent wearing and easy sliding quality.

Standard finish nickel plated. Can be furnished in oxidized copper or special finishes where required. For the most satisfactory service always use the largest size which the bottom of the leg will accommodate.

WITH MACHINE SCREW ATTACHMENT

Any of the above sizes can be furnished with 8/32 threaded machine screws with ⅜" length of projection above the rubber cushion.

New Nos. with Machine Screws	CG-290	CG-291	CG-292	CG-293
Diam. of Base	⅞"	1 1/16"	1¼"	1½"

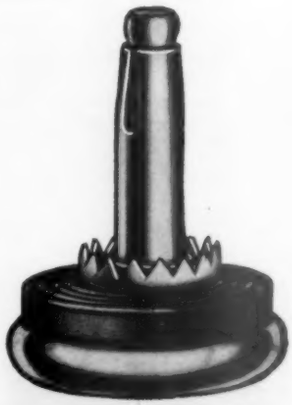
WITH GRIPNECK PINTLES

The following two sizes of Bassick Rubber Cushion Slides are available with pintles to fit standard ⅜" gripneck sockets for wood furniture.

Where chairs and other furniture are equipped with caster sockets these quiet, easy moving slides provide an easy and practical installation.

Nickel plated or oxidized copper finishes standard. Always specify finish desired.

Nos.	Diam. of Base	Bore for Socket	Wt. per Set—Oz.
CG-392	1¼"	⅜"	7
CG-393	1½"	⅜"	9



FAULTLESS CASTER CORPORATION

DEPT. SU-39

REPRESENTATIVES IN PRINCIPAL CITIES — Evansville, Indiana — CANADIAN FACTORY: STRATFORD, ONTARIO

DOUBLE BALL BEARING CHAIR CASTERS

In the office, the library, the study rooms, Quiet is a golden virtue. Faultless Casters are designed for quiet, smooth operation. Faultless Casters swivel quickly and with minimum effort. For the user, they make possible greater efficiency and contentment. Sturdy construction assures years of economical service. The special double ball bearing swivel caster featured here is finished in oxidized copper to harmonize with any furniture.

Packed in 1 Set Individual Display Carton with Sockets, Copper Oxidized Finish

RUBEREX (Cushion Tread) WHEELS

Style Number	Wheel Dia.	Wheel Bearing	Height, Floor to Track Plate
2478	1⅝	Plain	2⅛
2479	2	Plain	2½
BG2257-8	1⅝	Ball	2⅛

ROCKITE (Hard Tread) WHEELS

Style Number	Wheel Dia.	Wheel Bearing	Height, Floor to Track Plate
2778	1⅝	Plain	2⅛
2779	2	Plain	2⅛
BG2857-8	1⅝	Ball	2⅛

FAULTLESS CUSHION CHAIR GLIDES

Faultless Cushion Chair Glides give double protection. The live rubber insulation protects against jars and vibration; the smooth rounded edges of the glide protect floors from being marred. They are sturdily built of formed hardened steel and will outwear the chairs on which they are used. They are finished in oxidized copper, in four sizes, to harmonize with any style of furniture.

Packed in 1 Set Individual Display Carton, Copper Oxidized Finish

FLEXIBLE CUSHION CHAIR GLIDES

Number	Diameter Base
NRS	⅞"
NRS	1 1/16"
NRS	1¼"
NRS	1½"

CUSHION CHAIR GLIDES WITH MACHINE SCREW ATTACHMENT

Number	Diameter Base
SRS	⅞"
SRS	1 1/16"
SRS	1¼"
SRS	1½"
SRS with nut	⅞"
SRS with nut	1 1/16"
SRS with nut	1¼"
SRS with nut	1½"

CUSHION CHAIR GLIDES WITH SPRING CLIP SOCKET FOR METAL TUBING

Number	Diameter Base	Approx. O.D.
	For Round Tubing	
ORS	⅞"	⅞"
ORS	1 1/16"	⅞"
ORS	1 1/16"	1 "
ORS	1¼"	1 "
ORS	1½"	1 "
	For Square Tubing	
ORS	1 1/16"	1 "
ORS	1¼"	1 "

Specify outside diameter of tubing and whether socket is wanted for round or square tubing.

FAULTLESS FURNITURE CUPS

Packed in 1 Set Individual Display Carton

SQUARE ROCKITE OR RUBEREX FURNITURE CUPS

Number	Size of Opening	Weight Per Set
SDC 1⅛	1⅛"	6 Oz.
SDC 1¾	1¾"	7 Oz.
SDC 2	2"	13 Oz.
SDC 2⅝	2⅝"	15 Oz.

ROUND ROCKITE OR RUBEREX FURNITURE CUPS

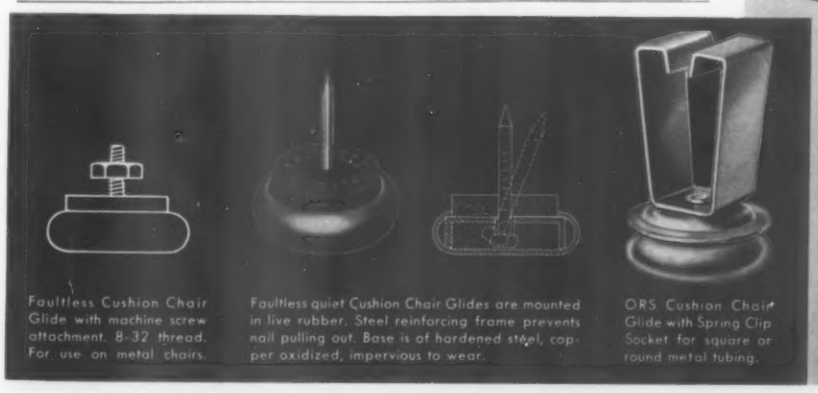
Number	Diam. of Opening	Weight Per Set
RDC 1⅜	1⅜"	5 Oz.
RDC 1⅝	1⅝"	7 Oz.

When ordering, specify whether Rockite (hard) or Ruberex (Cushion) is wanted

FAULTLESS DOUBLE WHEEL, DOUBLE BALL BEARING PIANO CASTER

With No. 98 Socket, Rust Resisting Finish

Style No. Ruberex Wheels (Soft Tread)	Style No. Rockite Wheels (Hard Tread)	Wheel Dia.
BW459-2	BW759-2	2"



Faultless Cushion Chair Glide with machine screw attachment. 8-32 thread. For use on metal chairs.

Faultless quiet Cushion Chair Glides are mounted in live rubber. Steel reinforcing frame prevents nail pulling out. Base is of hardened steel, copper oxidized, impervious to wear.

ORS Cushion Chair Glide with Spring Clip Socket for square or round metal tubing.

Notice the double row of polished and specially hardened ball bearings which assures quick swiveling, effortless movement and absolute quiet. Dust proof construction.

The wide shoulder with center of gravity offset at such great distance from the wheel is another Faultless feature that makes for positive swiveling.

Faultless Ruberex (cushion) or Rockite (hard) Furniture Cups, for stationary heavy furniture are made of non-breakable, rustproof composition, in a harmonizing brown shade that will not lose color.

Unless otherwise specified, Rockite Furniture Cups will be supplied.

No. 98 Socket

BW459-2 Double Wheel, Double Ball Bearing Caster for noiseless moving of pianos.

BUCKEYE GLIDE COMPANY, INC.

DEPT. AS–40

131 East 23rd Street, New York City, N. Y.

'HEAVY DUTY'

Quiet Moving on All Floors, Including Stone

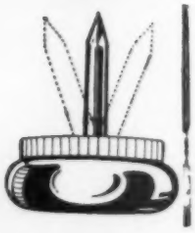
NOISELESS FURNITURE GLIDES

FOR EVERY TYPE CHAIR — DESK — TABLE — WOOD OR METAL

TYPE N—No. 136

For Wooden Chairs
Light Tables, etc.
⅞" dia.

•



TYPE N—No. 206
(Large Glide)

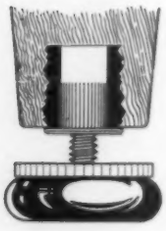
For heavy wooden Furniture of all kinds.
1¼" dia.

•

TYPE B

For Metal Furniture. Made in both regular and large size.
⅞" and 1¼" dias.

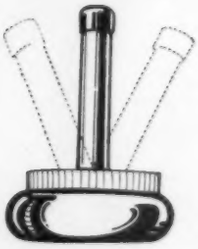
•



TYPE A—No. 206

To take wobble out of tables. To level furniture. To raise height of furniture.
1¼" dia.

•



TYPE P—No. 206

To use in place of casters. Fit into the caster socket.
1¼" dia.

Cross Section of the "SPRING-KUSHION" Silent Glide

The hardened steel cap takes all the wear. It is made of deep hard tempered steel, and will render years of active service without attention.

The heat tempered coiled steel spring is housed within the hardened steel cap, where it is protected from dirt, dust and grime.

The third member consists of a molded rubber cushion.

All Spring-Kushions have a flat base to prevent denting of soft floor coverings.

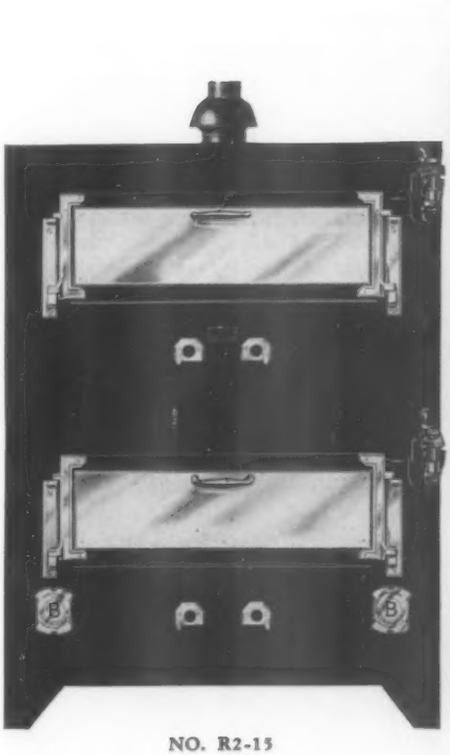
Standard Finish:
Bright Polished Nickel.
Optional:
Statuary Bronze Finish.

Specify
BUCKEYE "SPRING-KUSHION" NOISELESS GLIDES

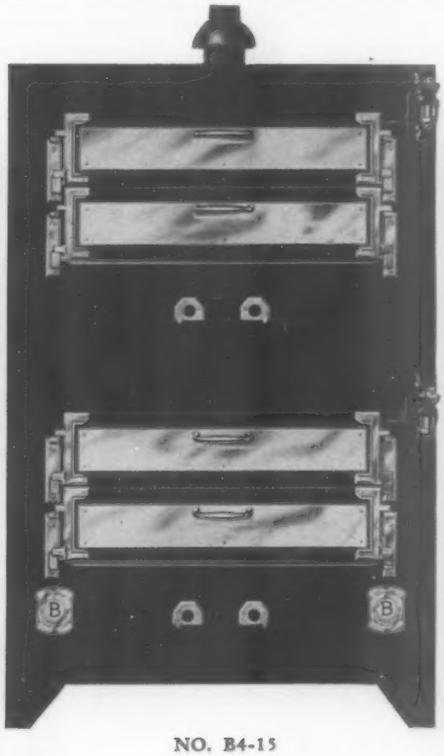
SAMPLES ON REQUEST

THE G. S. BLODGETT CO., INC.

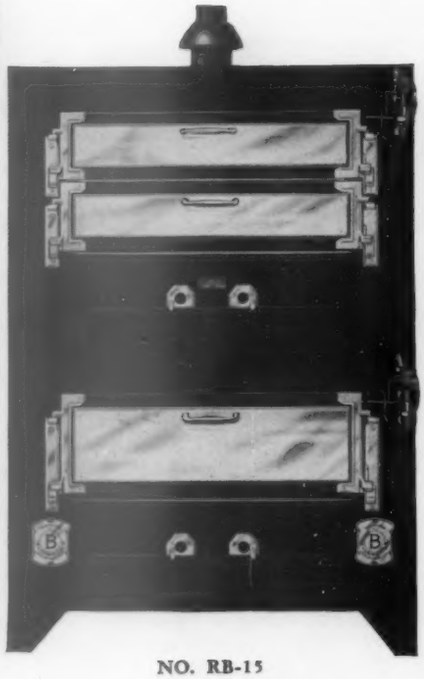
52 Maple Street
Burlington, Vermont



NO. R2-15



NO. B4-15



NO. RB-15

BLODGETT'S NEW GAS OVENS "TWO-IN-ONE"

Especially Suitable for School Kitchens and Cafeterias

The fact that Blodgett's ROASTER-BAKER Models have two separate compartments in one oven, each compartment with its own separate gas burners and automatic temperature control, so that **baking and roasting at different temperatures can be done at the same time,** makes them particularly valuable equipment for school kitchens and cafeterias.

These ovens are built in **three types** as shown. Each type is built in **two sizes.** Each compartment may be used equally well for baking or for roasting, with large or small, high or low, pans or pots. The ovens with high compartments are adapted for bean pots, tall dishes, and large or small roasts.

Economy in operation and **flexibility in use** are the dual advantages of using a ROASTER-BAKER Model. If there are two bakers, or one baker and one meat cook, each may have his own individual oven-compartment to operate and regulate as he sees fit. Temperatures may be quickly changed. On days when baking or roasting requirements are light, only one compartment instead of two need be used, thereby saving one-half the gas.

For **better, more uniform, greater-time-saving** baking and roasting, be sure to investigate the possibilities of Blodgett's ROASTER-BAKER for **your** school kitchen or kitchens.

No. of Oven		Outside Dimensions			Inside Dimensions		Capacities								B.T.U. Rating of Each Compartment (Max.) Per Hr.	Shipping Wgt. (Lbs.)
							Baking Compartments		Roasting Compartments							
		High Floor to top of Vent hood	Wide Over all	Deep Over all	Roasting Compartment	Baking Compartment	Bread 1 lb.	Pies 10"	Bean Pots 8 qt. 9" hi.	Meat Roast 15 lbs.	Turkeys 15 lbs.	Chickens 5 lbs.	No. of Burners in each Compartment	Length of Burners (Inches)		
RB-15	1 Roaster 2 Bakers	74½"	46"	30"	33" w.x 21½" d.x 10" hi.	33" w.x 21½" d.x 6½" hi.	32	12	6	4	4	10	2	24"	27,000	820
R2-15	2 Roasters	75"	46"	30"	33" w.x 21½" d.x 10" hi.				12	8	8	20	2	24"	27,000	800
R4-15	4 Bakers	79"	46"	30"		33" w.x 21½ d.x 6½" hi.	64	24					2	24"	27,000	860
RB-22	1 Roaster 2 Bakers	74½"	54½"	38½"*	41½" w.x31½" d.x10" hi.	41½" w.x31½" d.x6½" hi.	48	24	12	8	8	20	2	28"	41,000	1170
R2-22	2 Roasters	75"	54½"	38½"*	41½" w.x31½" d.x10" hi.				24	16	16	40	2	28"	41,000	1075
B4-22	4 Bakers	79"	54¼"	38½"*		41½" w.x31½" d.x6½" hi.	96	48					2	28"	41,000	1250

* By removing Doors, Manifold & Heat control, these ovens will go through a 36" door.

THE CLEVELAND RANGE CO.

Cleveland, Ohio

STEAM-CHEF STEAM COOKERS

for all School, College and Institution Kitchens
Direct Steam — Gas — Electric Operation

Cleveland "Steam-Chef" Direct Connected Unit

INCREASING numbers of installations, in recent months, in schools all over the country prove that Steam-Chef is the **right answer** to numerous kitchen cafeteria problems in educational institutions. Authoritative tests have established the fact that steaming, with the **proper** equipment, is an effective method of retaining natural food elements and higher nutritive values. A Steam-Chef Steam Cooker is an important saver of time, space, work and fuel. It is always ready for action, frees your range top for other purposes, and can be used for many foods now prepared in other ways. Steam-Chefs are designed for ease and convenience of operation—the average person can quickly learn to get maximum results from them. Whether your requirements are large or moderate, there is a correct Steam-Chef model to fit them, operated by direct steam, by gas, or by electricity. We are **specialists** on steam cookers, and thoroughly familiar with school and college requirements.

●

Send for interesting booklet "Getting the Most from Steam Cooking."

SIZES AND TYPES—Over 50 models, sizes and types . . . units to fit practically any requirement.

BODY CONSTRUCTION—One piece welded bodies of heavy plate steel . . . rust-proofed or stainless; easy to keep clean and sanitary.

"FULL FLOATING" DOORS—Always seat perfectly; never require adjustments; long gasket life.

SAFE OPERATION—Positive safety provided by doors which cannot be opened while steam is being admitted to compartments.

THERMOSTATIC EXHAUST SYSTEM—Eliminates steam vent line and reduces steam consumption 50% to 80%.

FULL AUTOMATIC CONTROL—Automatic fuel control, in addition to automatic control of boiler water level, on gas and electric units, effects fuel saving of 33⅓%. This is an exclusive feature.

Complete information and detailed specifications will be furnished on request. Sold through recognized kitchen equipment dealers everywhere.

Full automatic gas operated "Steam-Chef." Gas and water automatically controlled

PROMINENT SCHOOL INSTALLATIONS

Utica High School, Utica, New York
Bellingham High School, Bellingham, Washington
Iowa City High School, Iowa City, Iowa
Roosevelt School, Tulsa, Oklahoma
Whittier High School, Ames, Iowa
Wilson High School, Long Beach, California
Chicago Board of Education, Various locations
Peddie School, Hightstown, New Jersey
Brooks School, North Andover, Mass.
Central High School, Columbus, Ohio
Peoria High School, Peoria, Illinois
University of Wisconsin, Madison, Wisconsin
Princeton University, Princeton, New Jersey
Ursinus College, Collegeville, Pa.
State Teachers College, Lubbock, Texas
Madison College, Harrisonburg, Virginia
A & M College of Texas, College Station, Texas
Mars Hill College, Mars Hill, North Carolina
Michigan State College, East Lansing, Michigan
University of Michigan, Ann Arbor, Michigan
Kearney State Teachers College, Kearney, Nebraska
University of Texas, Austin, Texas
Louisiana Polytechnic Institute, Ruston, Louisiana
University of Akron, Akron, Ohio
Vassar College, Poughkeepsie, New York
Bryn Mawr College, Bryn Mawr, Pa.
Cameron State Agricultural College, Lawton, Oklahoma
Michigan State Normal College, Ypsilanti, Michigan
Skidmore College, Saratoga Springs, New York
Purdue University, LaFayette, Indiana
Duke University, Durham, North Carolina
University of Nebraska, Lincoln, Nebraska
Queens College, New York City
University of Maryland, College Park, Maryland
Colgate University, Hamilton, New York
University of Virginia, Charlottesville, Virginia
Swarthmore College, Swarthmore, Pa.
Dartmouth University, Hanover, New Hampshire
Brooklyn College, Brooklyn, New York
Syracuse University, Syracuse, New York

CRUCIBLE STEEL COMPANY OF AMERICA

Chrysler Building — 405 Lexington Ave.,
New York City

BRANCHES, WAREHOUSES AND DISTRIBUTORS IN ALL PRINCIPAL CITIES

REZISTAL STAINLESS STEELS

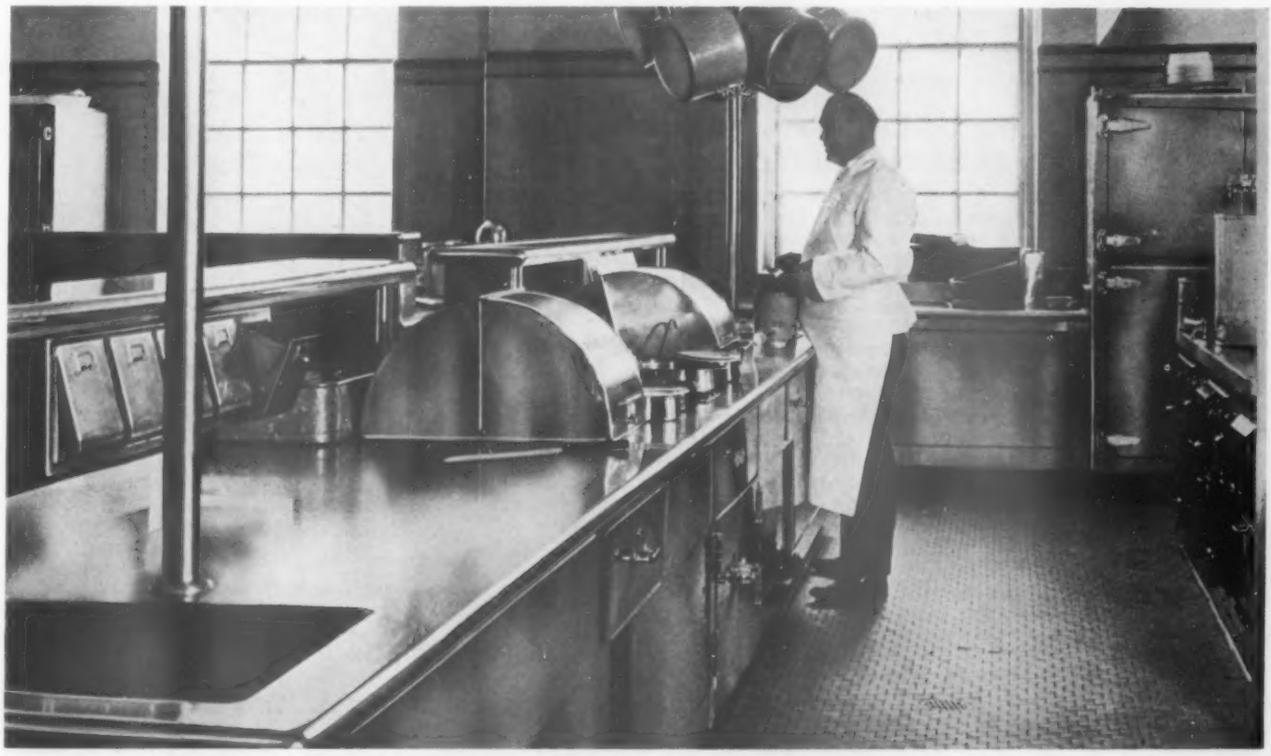
REZISTAL—the pioneer of Stainless Steels—is ideal for school kitchens and cafeterias; for work, preparation and bakers' tables; sinks; steam tables; serving counters; refrigerators; and hundreds of similar applications.

REZISTAL is not affected by any foods or food acids, does not tarnish or discolor, will not distort, and is not easily dented. It is smooth and easy to clean with a damp cloth or soap and water, thereby eliminating the necessity of buying expensive cleaning compounds. It is lustrous and silvery in appearance always—cannot chip, crack, corrode or wear away. It reflects that air of spotless cleanliness and sanitary conditions so essential in any school kitchen or cafeteria. There are REZISTAL stainless steels for every purpose and application, whether to resist corrosion or high temperatures, to reduce weight due to its high tensile strength, or for greater durability on account of its resistance to hard wear and abrasion. For permanent lustrous appearance combined with utility it is also most suitable for architectural and decorative treatments. For example, door kick plates, screen doors, spandrels, mullions, door jambs, hardware, window sills, stair treads, traffic and guard rails, and the like. Each have their type and finish in REZISTAL steels to suit the application.

REZISTAL Food Storage Refrigerators

REZISTAL stainless steel **readily lends itself to fabrication** calling for the utmost in **sanitary** finished equipment, such as the rounding of coves and corners which eliminate crevices, wherein foreign and unsanitary matter might otherwise lodge. REZISTAL Corrosion-and-Heat-Resisting Steels are obtainable in plates, sheets, rounds, squares, hexagons, flats, strips and welding rods and are available through authorized distributors or any of the 26 Crucible Branch Offices and Warehouses.

REZISTAL costs no more than other good stainless steels. It will certainly pay to see that it is specified in your next school equipment order. Many years afterwards it will still be saving money! Save maintenance costs by specifying . . . **REZISTAL!**



Modern Sanitary Kitchen Equipment made of Rezistal Stainless . . . Dartmouth College

EDISON GENERAL ELECTRIC APPLIANCE COMPANY, INC.

5600 West Taylor Street, Chicago, Illinois

MANUFACTURERS OF

COMMERCIAL **EDISON Hotpoint** EQUIPMENT

Announce A NEW ECONOMY FOURSOME FOR SCHOOLS, HOSPITALS AND INSTITUTIONS

THE "BRAWNY LAD"

NEW LOW PRICED COMMERCIAL RANGE

A low priced range of commercial construction and wide adaptability, the "Brawny Lad" is designed to fit installations where the heavy construction, large capacity, and higher cost of standard commercial ranges are not justified, yet where long hours use and institutional conditions render domestic type ranges unsuitable. In this classification fall the diet kitchen, the small hospital, the smaller school lunch room, and the community house where food is prepared to serve from ten to fifty persons per meal.

"Brawny Lad" has a large, fast automatic oven and may be equipped with four Hi-Speed Calrod surface units, two such units and a 12" x 24" automatic griddle, or a single 24" x 24" automatic griddle.

THE "HUSKY" OVEN

FOR ALL KITCHEN OPERATIONS

Now your kitchen can have that automatic temperature and directional heat controlled electric oven you have wanted so long. For these new "Husky" all purpose kitchen ovens are well within the reach of the average institutional budget. From angel cake to roasting turkey, they will do a splendid all round baking or roasting job for you. Then too, they are exceptionally fast—have that flash heat and punch to put the Chef through an unexpected swamping rush. Individual control of top and bottom heat, adjustable automatic temperature control, and each deck a separate oven make these the most useful to you. Available in one, two or three decks.

THE "HEAT MANAGER" SYSTEM

OF MODERN HOT FOOD STORAGE

Think of holding **mashed potatoes** good for eight hours—keeping cream of tomato soup without a sign of "breaking" all day!! Think of a hot food storage table which radiates very little heat — over which there are no dripping clouds of steam. A table without dripping valves or rusted water pans and without so much as a hint of that sour "Steam Table Odor." These are just a few of the reasons leading hospitals, schools and commercial establishments are rapidly adopting the new Edison-Hotpoint method of individually thermostatically controlled electric hot food storage units for tables and food carts. Ask your equipment house for a quotation.

THE "HEAT MANAGER"

LOW PRICED AUTOMATIC FRY KETTLE

Those luscious, golden brown, perfectly fried foods, literally "baked" in deep fat, add zest and pleasing variety to the general diet hospital tray or the school lunch. Many Hospitals and Schools, presided over by nationally known Dieticians use and endorse these accurately temperature controlled, fat saving Edison-Hotpoint electric fry kettles. The new fry kettle shown here is astonishingly low in price and even more surprisingly economical on both fat and electric energy consumption. Find out WHO uses and endorses EDISON-Hotpoint products before you buy.

ALSO A COMPLETE LINE OF AUTOMATIC ELECTRIC — **COMMERCIAL RANGES, BROILERS, BAKING AND ROASTING OVENS, STOCK AND FRY KETTLES, GRILLS, GRIDDLES, WAFFLE BAKERS, HOT FOOD STORAGE UNITS**

FOR SALE THRU LEADING KITCHEN EQUIPMENT HOUSES

STANDARD GAS EQUIPMENT CORPORATION

18 East 41st Street, New York, N. Y.

Other Conveniently Located Offices at: Boston Philadelphia Baltimore Aurora, Ill. Chicago New Orleans Los Angeles

Cooking Economy Centers on Your Gas Range Tops

Gas ranges do the heavy cooking jobs—80% of which are done on the cook top. That's why the cook tops are the one big key to kitchen economies.

The Vulcan Radial-fin top is the **only** top that goes the whole way in this direction. (1) It spreads the heat quickly and evenly over the entire top; (2) It stores up heat and will not chill when large vessels are placed upon it; (3) It keeps operating and maintenance costs down to the minimum.

Tested in numerous kitchens, under severest service, Vulcan Radial-fin tops have shown savings averaging 20%—and pleased the most exacting cooks. Study the illustration below and you will see why Vulcan Radial-fin tops do better work at lower cost.

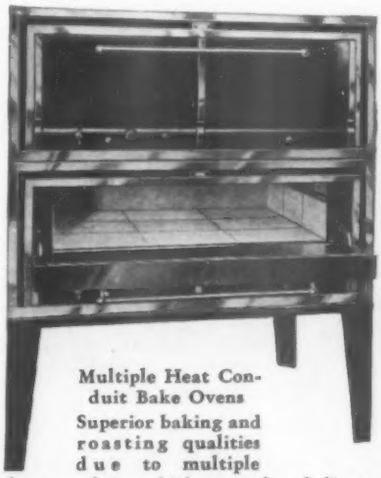
Hot-Top and Open-Top Range with Ceramic Salamander Broiler

Hot-Top fry, open and comb. top models. Insulated heat-controlled oven. 39½" and 40" wide, 41¼" deep, 73⅞" high overall

Vulcan chrome-nickel radial-fin top construction produces substantial top-cooking economies. Fins form flues which direct heat to every part of top, increasing the effective cooking area and providing 68% more heat absorption surface. Resting on a fire-brick base, the fins form sturdy columns which support the top. The massive construction practically eliminates replacements

Radial-Fin-Top Range with High Shelf

Several other types of tops. Insulated heat-controlled oven. 31¼" and 26½" wide, 34¼" deep, 68¼" high overall



Multiple Heat Conduit Bake Ovens

Superior baking and roasting qualities due to multiple heat conduits which control and direct heat to every part of oven. Bakers tile lining. Extra thick insulation. Each section has automatic heat control. 55" wide, 47¾" deep, 24½" and 21" high

Heavy Duty Ceramic Broiler

Produces superior product due to ceramic burner. 35% faster, uses less fuel. Finishing oven. Insulated. Two sizes 31¼" wide, 41¼" deep, and 26½" wide, 34¼" deep, 71¾" high overall. Also made in smaller units, less oven

Deep Fat Fryers with Immersed Flues

Assure high quality fried food due to quick heat recovery. Insulated, automatic heat control. Save fat, fuel and food. Two sizes in both single and double unit types. Can be connected in battery with Vulcan equipment. Double unit shown here is 31¼" wide, 33⅛" deep, 39½" high

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VULCAN GAS COOKING EQUIPMENT

THE ALUMINUM COOKING UTENSIL COMPANY

New Kensington, Pa. — Oakland, Calif.

BRANCHES

Baltimore, Md. Boston, Mass. | Chicago, Ill. Cleveland, Ohio | Kansas City, Mo. Minneapolis, Minn. | New York, N. Y. Philadelphia, Pa.

"Wear-Ever" Gas Heated Steam Jacketed Kettle

"WEAR-EVER" STEAM JACKETED KETTLES

These seamless kettles are sanitary because they are made of dense, non-porous, extra thick, hard wrought sheet aluminum which resists the actions of fruit and food acids, without at any time forming a poisonous compound with them or affecting their taste, odor or color. They are easily kept clean.

On account of the high heat conductivity of aluminum, "Wear-Ever" kettles pass heat rapidly and give products quick even cooking. Fuel is saved because less steam pressure is required; time is saved because they heat quickly.

"Wear-Ever" Small Trunnion Kettle

"Wear-Ever" jacketed kettles actually cost less than other high grade kettles. Valuable not only for general work, they may also be used for roasting or for waterless cooking. Many sizes and styles are available.

"WEAR-EVER" ALUMINUM TRAYS

After years of scientific research, metallurgists have developed a formula for a new aluminum alloy for trays, combining all of the ideal qualities for cafeteria service. Come in eight sizes—natural or with the Alumilite Finish. We invite you to put these trays to a service test.

"Wear-Ever" Aluminum Tray

"WEAR-EVER" RANGE UTENSILS

The "Wear-Ever" line of heavy duty aluminum ware includes everything needed in the form of range utensils—sauce pans, sauté pans, stock pots, etc.—all made of thick sheet aluminum,—every utensil made from a single piece of metal without joints or seams and with extra thickness of metal where needed to resist wear. For full information regarding heavy duty and semi-heavy range utensils, see your supply house or write for catalog.

"Wear-Ever" Heavy Duty Stock Pot

"Wear-Ever" Semi-Heavy Sauce Pans

"WEAR-EVER" PITCHERS WITH COOL HANDLES

"Wear-Ever" pitchers are available in capacities from 1 to 4 qts. They permit easy and comfortable handling of hot and cold liquids.

"Wear-Ever" Rectangular Steam Table Pan

A complete "Wear-Ever" catalog is available. Send for your free copy to The Aluminum Cooking Utensil Co., 11th St., New Kensington, Pa.

THE SILEX COMPANY

Hartford, Conn.

RESTAURANT MODEL

Genuine SILEX

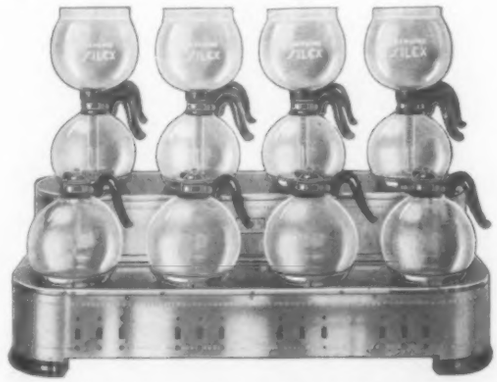
TRADE MARK REGISTERED U.S. PAT. OFF.

GLASS COFFEE MAKER

4-UNIT NEW YORKER MODEL WITH BUILT-IN HOT WATER TANK

Stainless Steel range, body and outer tank shell. Satin finish. Burner grids and tank drip basin in baked porcelain enamel finished in black. Two combination high and low heat burners. Two low heat burners for storage or warming purposes only. High heat 6,500 b.t.u. each. Low heat maximum 400 b.t.u. Range dimensions 25½" x 15" x 25". Catalog Number TWG-4-12. Range complete with built-in water tank. 2 complete coffee makers, 2 decanters, ½ gallon size, 4 tea stoppers, and 50 cloth strainers.

Also available in models for electric service, and 8-unit size as well as 4-unit size.



8-UNIT ELECTRIC TERRACE MODEL

Stainless Steel range body in satin finish. Top and flanged cups chrome plated brass. Equipped with four combination brewing and warming elements. Slow-cooling brick type 1000-85 watts each. And four individual warming elements 85 watts each. Catalog Number TE8-12. Range complete with 4 coffee makers and 4 decanters, ½ gallon size, 8 tea stoppers and 50 strainer cloths.

Also available in a 6-unit size and for gas service.

WHY SILEX IS BEST

Silex has conceived and developed every worthwhile feature found in glass coffee makers. All electric stoves for household models are "self-timing." The coffee automatically returns to the lower bowl without removing the glass from the stove. Pyrex brand glass used exclusively.

Filtration is through cloth, the only method of securing coffee free from sediment and dregs. In the Silex Glass Coffee Maker the filter is held firmly in position which allows the upper bowl to be inverted or placed on its side without danger of the filter falling out or breaking the bowl.

DELRAY ELECTRIC MODEL

Complete with Moldex cover, neck collar, and stove base in red or black. "Self-timing" stove is chrome plated. Supplied with plain cord set. Available in 2, 4, 6, 8, and 10 cup sizes in black or red trim.

EVERYDAY KITCHEN MODEL

Complete with Moldex cover, upper and lower bowl handles, neck collar, and table mat in gleaming red or black finish. May be supplied in 2, 4, 6, 8, and 10 cup sizes in black or red trim.

DOMESTIC MODEL

Genuine SILEX

TRADE MARK REGISTERED U.S. PAT. OFF.

GLASS COFFEE MAKER

R. WALLACE & SONS MFG. CO.

Silversmiths Founded 1835 — Wallingford, Conn.

BRANCH OFFICES: New York Chicago San Francisco Los Angeles

WALLACE SILVERWARE — Especially Designed for Institutional Use

Style . . . with stamina. Outstanding popularity and unique manufacturing processes . . . plus consequent volume production . . . account for the range of low prices of the eight flatware designs shown below. Each pattern is made from either a heavy or an extra heavy "blank" of 18% nickel silver and plated with pure silver according to recognized schedules. All eight are worthy representatives of the reliable workmanship and quality so characteristic of the products of this 105-year old firm of silversmiths.

Another important factor has not been overlooked—simplicity in design insuring easy and complete cleansing.

Buyer's Chart of Prices and Qualities

The prices are NET for Tea Spoons, per dozen. Prices of other staple items would be in proportion. All patterns are regularly butler finished. Write your regular supply house—but if you have any difficulty in obtaining Wallace patterns, write us direct for samples and any further information you may desire.

Mission	Roxbury	Saxon	Oxford	Windsor	Norman	Choate	Andover	Quality
								Note—In the descriptions below references are made to "9-lb. blanks" and other weights. This means that a gross of Tea Spoons weighs 9 lbs. . . . etc.
				$.90 per doz.				The most for the least money. Half Plate . . . Plus. Heavy 9-lb. "blanks."
		$.95 per doz.	$.95 per doz.	$.95 per doz.				Longer wear at slight additional cost. Half Standard Plate—Sectional . . . extra plating at points most exposed to wear, on staple pieces. Heavy 9-lb. "blanks."
				$1.10 per doz.				Less cost over long period of use. 5 oz. Plate (tablespoons) sectional . . . heavier than standard plating; more silver at "wear points" of staple pieces. Heavy 9-lb. "blanks."
				$1.35 per doz.				Same as next above . . . except that "blanks" are 11-lb. extra heavy.
$1.40 per doz.	$1.40 per doz.				$1.40 per doz.	$1.40 per doz.		Also same as above as to plating schedule . . . but based on "fancy" patterns and extra heavy 10½-lb. "blanks."
							$2.50 per doz.	Greater economy in the long run. AA Sectional; 6 oz. plate (tablespoons), much heavier than standard, with extra plating at "wear points" of staple pieces. Extra heavy 11½-lb "blanks."

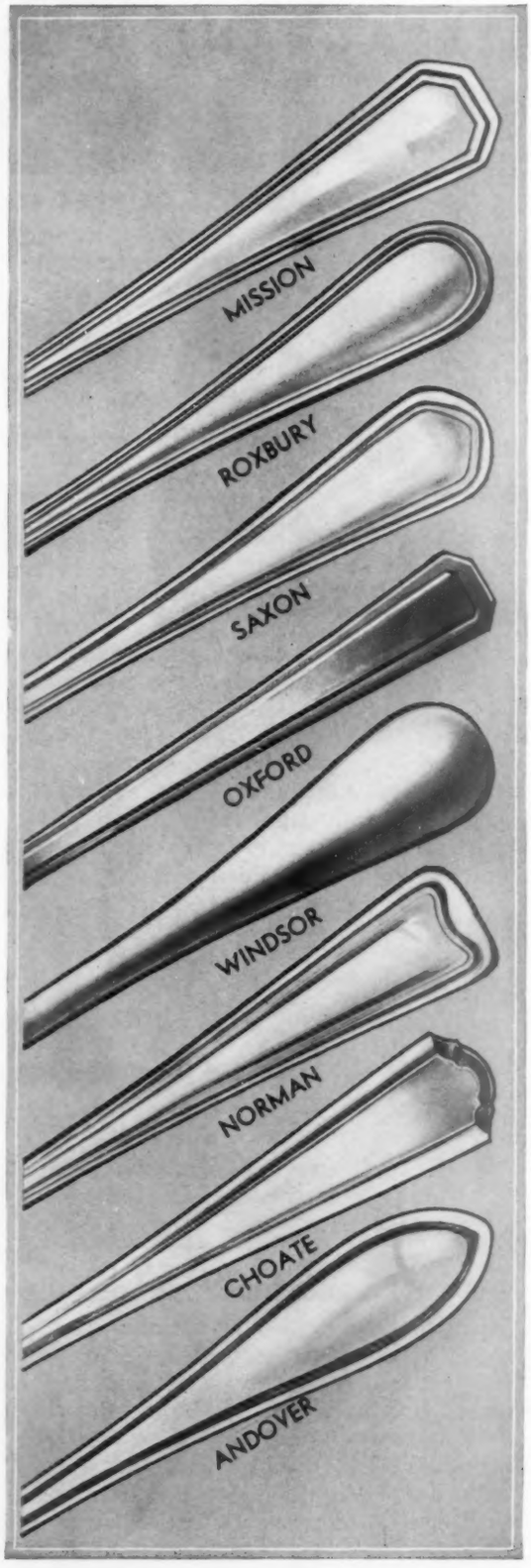
All prices quoted are for Tea Spoons only.

All prices subject to change without notice

Here is shown one example of Wallace's large line of hollow ware . . . the No. 0237 Urn, made in two sizes: one gallon capacity, 16½ inches high; and two gallon capacity, 22½ inches high.

With its pleasingly simple lines, its heavy gauge nickel silver base metal (all parts silver soldered), and its high quality finish on extra heavy silver plate . . . this Urn is characteristic of the craftsmanship that has made the Wallace name famous since its beginning in 1835 . . . 105 years ago.

A copy of our catalog, featuring both flat ware and hollow ware, will be sent on request.



THE HOBART MANUFACTURING CO.

Makers of Electric Food-preparing and Dishwashing Machines for Commercial and Institutional Kitchens and Bakeries

Troy, Ohio

ATLANTA, GA., 336 Marietta St., N. W.
CHICAGO, ILL., 61 Wacker Drive
DALLAS, TEX., 2034 Commerce St.
LOS ANGELES, CALIF., 412 S. Los Angeles St.
NEW YORK, N. Y., 71 Madison Ave.
ST. LOUIS, MO., 1935 Washington Ave.
SAN FRANCISCO, CALIF., 929 Mission St.
SEATTLE, WASH., 2208 Second Ave.

CANADA: Head Office, 119 Church St., TORONTO

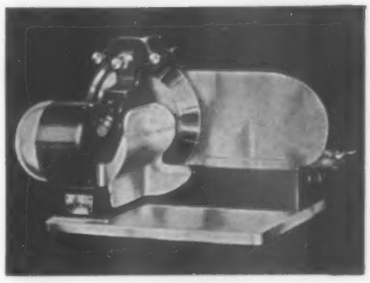
SALES AND SERVICE OFFICES IN ALL PRINCIPAL CITIES (Consult Telephone Directory)

HOBART MACHINES ARE SOLD THROUGH LEADING KITCHEN OUTFITTERS

Peelers **Air Whips**

Hobart Potato Peelers

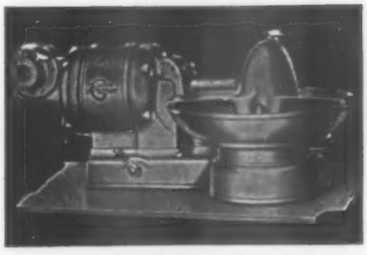
Bring new savings in time and food costs. There are four sizes, with capacities of from 8 to 45 lbs. peeled in "no time" with negligible peel loss. Quiet, speedy and watertight, they can also be used for sweet potatoes, carrots, parsnips, turnips, etc.



Food Slicers

Hobart Slicing Machines

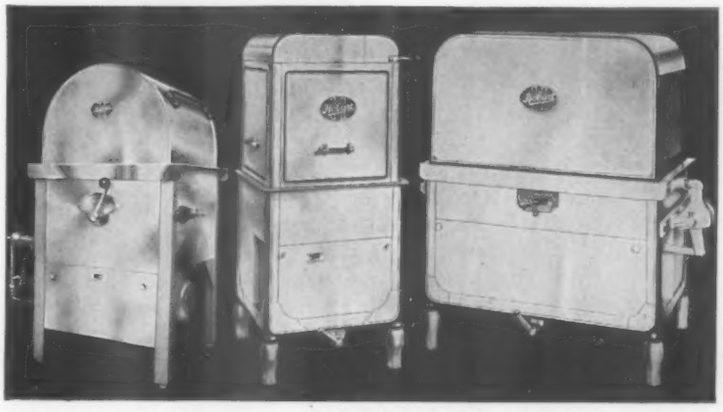
The Hobart Electric Ball Bearing Slicing Machine combines the latest features in one machine. Ideal for all boneless meats, hot or cold, cooked or uncooked, bread, cheese, vegetables, fruits, etc. Convenient to operate, speedy, quiet, and easy to clean. Maximum safety. New model in black and white Dulux, with Hobart Stay-sharp Stainless Steel Knife.



Food Cutters

Hobart Food Cutters

Embody distinct advances in speed, thoroughness, safety, ease of cleaning, and economy of space. They cut up meats, vegetables, firm fruits, cocoanuts, citron, nuts, boiled eggs, beets—practically anything in the food line, uniformly in a few seconds' time.



Dishwashers
Left: **compact, low-priced heavy-duty unit, "LM"**
Center: **"AM-5" de luxe.** ***Right:*** **"XM-2," fully automatic**

Mixers
Left: **A-200, "two mixers in one"—20 and 12-qt. bowls.** ***Right:*** **M-80 Super Mixer**

Hobart Mixers

Built in 3, 5, 10, 12, 15, 20, 30, 40, 60, 80 and 110-quart bowl capacities. They mix, beat, whip, blend, mash. With attachments they chop, grind, slice, shred, grate, crumb, sieve, strain, etc.

Hobart Air Whip Attachment (for Hobart Mixers only) supplies advantages in regular mixing bowl operations, by better aeration; improves cake quality tremendously; reduces mixing time as much as 30% to 40%.

Hobart Air Whip Unit

Introduces a superior method of whipping cream. In a few seconds it produces 3 or more quarts of whipped cream from 1 quart of liquid cream. It whips by air, keeping all the freshness and sweetness of the cream. More and better whipped cream dishes can be made at less cost.

Hobart Glass and Dish Washers

Automatic and semi-automatic models. Made in a complete range of sizes, for kitchens of any size. They wash all tableware clean, with a high degree of sterilization, in the shortest possible time. They carry such exclusive features as Revolving Wash Arms and the patented Dual-Drive Conveyor.

Guarantee and Service

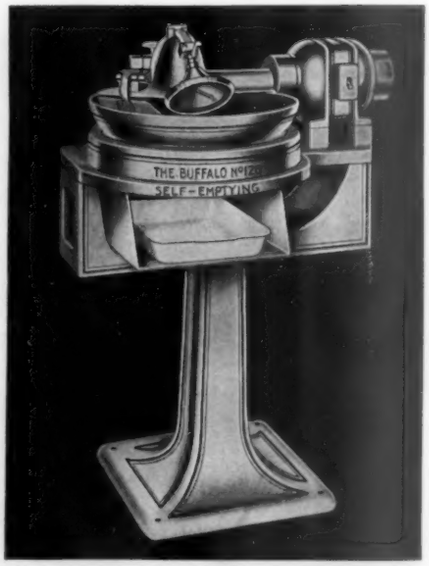
A distinct advantage to the school kitchen is that all Hobart Machines are fully guaranteed and serviced by one nation-wide organization. This avoids uncertainty, confusion and money-losing delays. Every Hobart Machine "gives more for the dollar." Each machine is built completely—even to the motor—by our own skilled craftsmen. Telephone your local Hobart office, or write us direct to Troy, Ohio.

JOHN E. SMITH'S SONS COMPANY

50 Broadway, Buffalo, N. Y.

Manufacturers of BUFFALO Food Cutters, Meat Choppers, Vegetable Slicers and Bread Slicers

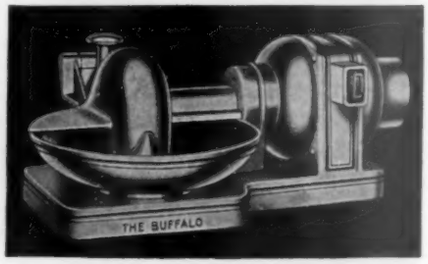
BUFFALO FOOD CUTTERS



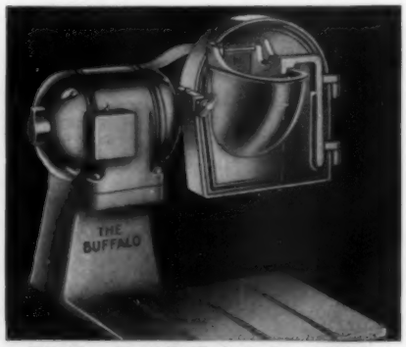
Any School kitchen, regardless of size, can reduce expense by installing a Buffalo Food Cutter. The savings in time and the reduction of waste have returned the cost of the machine many times over in hundreds of School kitchens. Buffalo Food Cutters are built in 7 sizes to fit varied requirements. All operate on the same principle—with crescent shaped knives cutting against a curved, slowly revolving bowl. The sheer, draw cut prevents mashing and improves the texture of the food. Any food—meats, vegetables, fish, fruits, etc., can be chopped equally well. Grinder and vegetable slicing attachments are available with all models. All Buffalo Food Cutters are equipped with safety switches and the knives are fully protected.

MODEL 120 BUFFALO FOOD CUTTER provides the exclusive Buffalo Self-Emptying feature. It is an easily operated, thoroughly sanitary device—simply a hole in the bottom of the bowl and a leak-proof plug which, when raised, allows the food to drop into the pan below. The entire operation is a matter of seconds and since the food need not be touched, there is no possibility of injury to the operator.

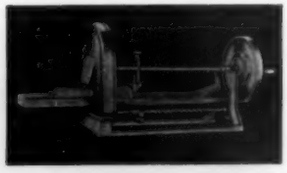
Capacity of bowl: 20 Pounds of meat
Motor: 1 H.P., fully enclosed, ball bearing type



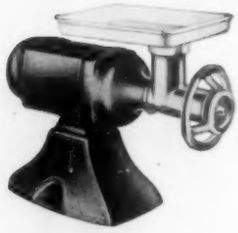
MODEL 114 BUFFALO FOOD CUTTER is designed for small kitchens. It has a bowl capacity of 7 pounds of meat. By swinging back the top plate the bowl lifts out for cleaning. Model 114 is available with or without pedestal. Equipped with ⅓ H.P. ball bearing type motor.



THE BUFFALO VEGETABLE SLICER is a sturdy, compact unit designed for a variety of purposes. It will slice or grate nearly all kinds of fruits, vegetables, nuts, etc. In addition to various slicing and grating discs, it can also be equipped with a meat grinding attachment. ⅓ H.P. motor.



THE BUFFALO BREAD SLICER saves two to three slices per loaf over hand slicing. It automatically feeds the loaf to the knife and cuts uniform slices at a rate of 175 to 200 per minute. The thickness of slice can be adjusted from ⅛" to ⅞". Made in 3 sizes, hand or power driven.



THE BUFFALO MEAT CHOPPER cuts clean with no backing up or mashing. It is fast, convenient, thoroughly dependable and entirely safe. It is available in 5 sizes with capacities of from 3 to 15 pounds per minute.

WRITE FOR COMPLETE CATALOG "BUFFALO KITCHEN MACHINES"

ACME BULLETIN & DIRECTORY BOARD CORP.

35-37 East 12th Street, New York

MANUFACTURERS

Bulletin boards for thumb tack or changeable letter notices and announcements.

Directory boards in changeable letter or embossed name strip style.

Menu boards changeable letter style.

Honor Roll Boards in changeable letter or name strip style.

Changeable letters made in flat or embossed celluloid—also cast aluminum.

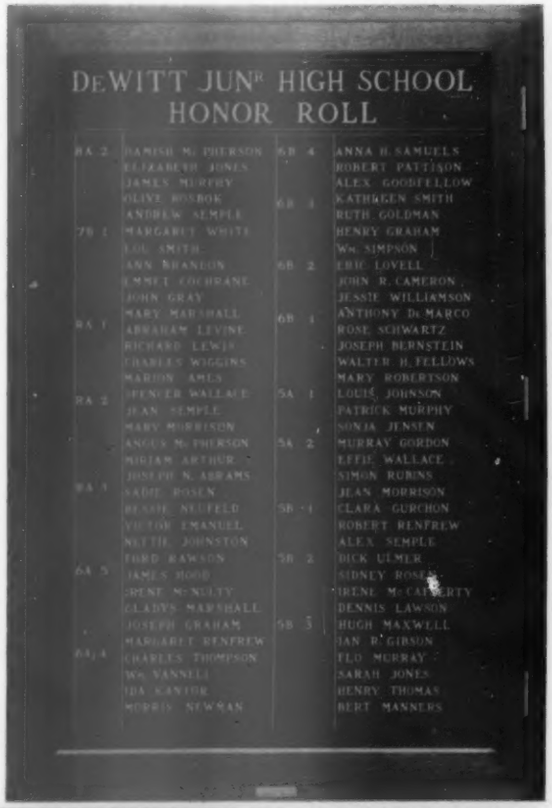
Frames of boards can be supplied in wood or metal, with or without glass doors.

STYLE No. 205

Featuring a two-section changeable letter menu board in a stainless steel frame. Has overlap glass hinged door, each section removable. Letters shown are our ¾" and 1" embossed celluloid

Illustration at right shows an honor roll board in a wood frame having an inset hinged glass door with lock and key.

The pupils' names are set up in our ¾" white cast aluminum letters. Can also be made like Style No. 2500 where names are embossed on one piece strip instead of changeable letters.



STYLE No. 70

Cork bulletin board for thumb notices. Made in any size, with or without glass door

SYYLE No. 2500

An extruded bronze framed Directory holding 3 7½" x 20" ACME black steel panels. Heading plate is in raised bronze letters. Names are embossed on one piece strips ⅛" high. A large variety of different size directories using smaller name strips can also be supplied

CHELSEA PRODUCTS

281 11th Avenue, New York

CAFATRAYS

Eleven Popular Sizes for *Every School Cafeteria Purpose*

Facts About CAFATRAYS

- **Quiet**—They absorb noise . . . make no harsh clatter in handling, stacking or serving, even when hundreds are being used in the same room.
- **Sanitary**—CAFATRAYS come up rich and lustrous after one dishwashing. They look clean, and what's more, they ARE clean. Their hard, smooth surface cannot absorb grease or food matter. They never stain, even from fruit acids.
- **Tough**—They are practically indestructible. We made them to stand the gaff of modern dishwashing machinery and all the banging around that modern food service gives. Years of service in some of the largest chain cafeterias in the country have proven their stamina.
- **Light**—CAFATRAYS are made as light as it is possible to make a tray and still achieve durability.
- **Beautiful**—Their beautiful burl-grain mahogany color, cast in the body itself, never fades. And there is no surface lacquer or other super-imposed finish to wear away or mar.
- Ask your equipment dealer for **Genuine CAFATRAYS.**

Catalogue Number	Size	Weight Packed in Cartons of 1 Doz.	Some Uses
75	4½" x 6½"	2½ lbs.	Infirmary Tray
1344	6 " x 8 "	4 lbs.	Tea Tray
1345	8½" x 11 "	7 lbs.	Nutriment Service
1346	10¾" x 14 "	12 lbs.	Sandwich Tray
1347	12¼" x 16½"	18 lbs.	School Cafeteria
1348	14 " x 18 "	23 lbs.	Standard Cafeteria
1348½	15¼" x 20½"	34 lbs.	Dining Room Tray
1349	16½" x 22½"	48 lbs.	General Food Service
1111	11" Round	8 lbs.	Ice Water Service
1414	14" Round	14 lbs.	Sandwich or Water Tray
1616	16" Round	23 lbs.	Waitress Tray

NOW IN REGULAR USE AT—

Princeton University
Princeton, N. J.
Columbia University,
New York City
Public School Cafeterias,
Seattle, Wash.
Fordham University,
New York City
Villa Maria Academy,
Malvern, Pa.
Cherry Valley Central School,
Cherry Valley, N. J.
Eastern Texas State Teachers' College
Commerce, Tex.
Public School Cafeterias,
Houston, Tex.
Michigan College of Mining and Technology,
Houghton, Mich.
Dep't of Hospitals of the City of New York
New York City
John B. Stetson University,
De Land, Fla.
Mountain Lakes High School,
Mountain Lakes, N. J.
Purdue University
Lafayette, Ind.
Wyandotte High School,
Kansas City, Mo.
State Hospitals,
State of Missouri
Bureau of Printing and Engraving Cafeteria,
Washington, D. C.
Long Beach Schools,
Long Beach, Calif.
Los Angeles Schools,
Los Angeles, Calif.

S. BLICKMAN, INC.

Manufacturers of Food Service Equipment for Schools and Institutions

WEEHAWKEN NEW JERSEY

THE firm with whom you entrust the fulfillment of your food service equipment program must measure up to most exacting standards of technical and fabricating ability. Business assumes the aspect of a pleasurable experience when a helpful attitude and spirit of cooperation affords you peace of mind and establishes confidence. Such a desirable situation is only possible to expect from concerns enjoying a very large volume of business, supported by adequate manufacturing facilities, fully developed mechanized processes, and skilful mechanics.

Observing the fiftieth year of our founding, we feel that our present organization manifests consistent growth throughout this half century, and the many outstanding equipment installations bearing our name, attest our contribution to the advancement of satisfactory food service. •Catalogs of standard items, and descriptive material of many units of special nature are available. Whether your requirements involve one or two items, or a complete equipment project, we invite you to communicate with us.

NATHAN STRAUS-DUPARQUET, Inc.

Sixth Avenue, Eighteenth to Nineteenth Streets, New York City

Telephone: WAtkins 9-5200 Cable Address: "STRAUS," New York

Jones, McDuffee & Stratton Corp.
367 Boylston Street, Boston, Mass.

Duparquet, Inc.
225 N. Racine Ave., Chicago, Ill.

A RELIABLE SOURCE OF SUPPLY

Kitchen Equipment and Installations, Utensils, China, Glassware, Silverware, Furniture, Linen, Beds, Bedding

Section of Kitchen Equipment Department, New York Showrooms

UNIVERSITY AND SCHOOL EXECUTIVES

WHATEVER the capacity of your educational institution, we can be of service to you in providing equipment for cooking, baking, warming and serving food. Our experience goes back over a period of 100 years. Since 1838 we have furnished equipment and supplies for thousands of kitchens. Duparquet ranges and special kitchen apparatus have had long years of recognition as the highest in quality and the most durable in their particular field.

Nathan Straus-Duparquet kitchen equipment has been installed in many of the finest modern schools and colleges in the United States. The roster of these is too long to quote here, but we mention Fordham University, Dartmouth College, University of Notre Dame, Columbia University, Cornell University, Connecticut College for Women, Taft School, Phillips Exeter Academy, Bronxville High School and Peekskill High School as examples of our work.

In these and in many similar institutions, we have worked out kitchen plans in conjunction either with the architects or executives. Our large and experienced engineering staff is available for assistance and cooperation in the preparation of kitchen installation plans. When you have an equipment problem to solve, we will be glad to have you call on us for discussion, plans and estimates.

Our Supply Department covers the entire range of items needed for service and operation — China, Glassware, Silverware, Kitchen Utensils and Equipment, Furniture, Refrigerators, Linens, Bedding. We carry very large stocks and are prepared to give prompt deliveries as required.

Write us about any individual items of equipment or supplies that may be required. We will be glad to send you full information and estimates.

WRITE FOR A FREE COPY OF OUR NEW CATALOG

IT WILL BE OFF THE PRESSES EARLY IN 1940

It is a veritable encyclopedia for purchasers of food service equipment. It contains 2600 illustrations. Every executive responsible for School or College food service should obtain a copy

THE JOHN VAN RANGE CO.

525–555 Culvert Street, Cincinnati, Ohio

John G. Carlisle School, Covington, Kentucky

Like all other food service problems, whether it be hotel, hospital, no two school kitchens are alike, altho their problems are similar. John Van is ready to help you in the solution of such problems.

Send us the floor plan of the food service kitchen floors for any buildings that are in the planning stage, as well as permit us to counsel you on any reorganization planning which you have in mind for more economical service. The John Van Range kitchen engineers' analysis and recommendation may save you hundreds of dollars in operation or in purchase of necessary new equipment.

No matter how large or small your school, John Van can help. For instance, the above photograph shows the counter, and the kitchen in the background, for this Covington, Kentucky, Elementary and Junior School, with an enrollment of about 350 to 400. The picture below shows the cafeteria counter in the new Student Union Building, University of Cincinnati, where more than 205,000 meals were served between September 1, 1937 and February 1, 1938. Whether the meals are counted in scores, hundreds or thousands, this organization is glad to assist not only as a manufacturer of equipment but also as a trained service organization.

Student Union, University of Cincinnati, Ohio

Gas Fired Steamer

Not every school is large enough to use a John Van Range Steamer. However, where the school or college is large enough, such equipment is practically indispensable. John Van Steamers, in the three principal types—the standard Model F, the Pressure Type Automatic Steamer and the Cabinet Type Steamer, as illustrated at the left, not only assure the scientific accuracy required in modern kitchens, but also bring economy of floor space, fuel and human effort.

The steamer illustrated, while a single compartment, can be used for steaming various items at the same time without intermingling of flavors.

John Van Range equipment for the preparation and service of food (ranges, sinks, counters, work and serving tables, steam tables, coffee urns, etc.) is all of the sturdiest construction.

TYPICAL JOHN VAN INSTALLATIONS

Northeast

Boston Public Schools	Boston, Mass.
Holy Cross College	Worcester, Mass.
Central and Eastern Senior High Schools	Lynn, Mass.
U. S. Coast Guard Academy	New London, Conn.
Brooklyn Technical High School	Brooklyn, N. Y.
Pennsylvania State College	State College, Pa.
Providence College	Providence, R. I.

Southeast

University of South Carolina	Columbia, S. C.
Duke University	Durham, N. C.
University of North Carolina	Raleigh, N. C.

South

Caddo Parish Schools	Shreveport, La.
Atlanta University	Atlanta, Ga.

Southwest

University of Texas	Austin, Texas

West

University of Colorado	Boulder, Colo.
University of Nebraska	Lincoln, Neb.

Middle West

Purdue University	Lafayette, Ind.
University of Cincinnati	Cincinnati, Ohio
Michigan State College Union Bldg.	Ypsilanti, Mich.
Lane Technical High School	Chicago, Ill.
John G. Carlisle School	Covington, Ky.
Kanawha County Schools	Charleston, W. Va.
University of West Virginia	Morgantown, W. Va.

JOHN SEXTON & COMPANY

Manufacturing Wholesale Grocers

Chicago **Importers** **Coffee Roasters** Brooklyn

Edelweiss Quality Foods

The Standard of Comparison

CHICAGO

John Sexton & Co., welcomes comparison with any other food supply service for those who feed many people each day. Check the following facts about Sexton and Sexton service with the corresponding facts about any other similar service.

SEXTON SERVICE	ANY OTHER SERVICE
1. Established in 1883—continuously under Sexton management.	1. _____
2. Responsibility—the highest.	2. _____
3. Superb Service—Daily delivery New York and Chicago. All orders shipped within 24 hours of receipt.	3. _____
4. Coffee Merchants for over 50 years. Direct importations—daily roasting—a saving to you in every pound.	4. _____
5. All fruits and vegetables selected according to Sexton specifications. Uniform number of servings to the tin. All cans chock-full of fully ripened and delicious fruits or vegetables.	5. _____
6. A complete variety of high quality preserves and jellies, gelatine desserts, extracts, baking powder made in Sexton Sunshine Kitchens.	6. _____
7. Sexton pickles, rich in Oriental spices, pickled in pure vinegar and crystal cane sugar in Sexton Sunshine Kitchens.	7. _____
8. Pre-eminent importers of Spanish olives—save buyers one profit.	8. _____
9. Tender leaf teas imported from the Tea Gardens of Japan and India. Sexton teas retain the full volume of essential oils and theine found in the blossomed leaf.	9. _____
10. A large staff of thoroughly trained salesmen, experienced with the needs of those who feed many people each day. A Sexton representative in every state in the Union.	10. _____
11. Endorsed by the National Associations of the various enterprises feeding many people each day.	11. _____
12. The Sexton guarantee of complete satisfaction or money cheerfully refunded accompanies every sale.	12. _____

BROOKLYN

If you are among the vast number of Sexton patrons, you have proved already the convenience and economy of these and other features of Sexton service. From all others we invite a trial order, the severest test you can make

SECTION X
LABORATORY DESIGN AND EQUIPMENT

THE HIXON LABORATORY FOR MEDICAL RESEARCH

BY H. R. WAHL, M.D.

Dean, University of Kansas School of Medicine

THE Hixon Laboratory for Medical Research at the University of Kansas was planned and erected to stimulate research in the various branches of medicine, and to provide facilities and opportunity for young and ambitious graduates in medicine to work on their problems. The laboratory also centralizes the major basic investigative studies of the school and hospitals, especially those that do not require the presence of patients. In this way, unnecessary and expensive duplication of equipment, material, and labor is avoided. In addition, the concentration of research activities in this building fosters a spirit of mutual cooperation among the various workers in the different departments of hospitals and school.

The laboratory is one of the recent units of the School of Medicine of the University of Kansas, and is located in the Kansas City division of the school, on the same campus as the hospitals. The last two and a half years of the medical course is offered here, while the first year and a half is offered on the main univcrsity campus at Lawrence, forty miles away. This Kansas City building provides quarters for the Department of Experimental Medicine of the Medical School, which has its own salary and maintenance budget the same as any other department. The research work in the laboratory is supervised by a part-time Director, who happens, at present, to be the Professor of Medicine, and by an Assistant Director, who is also in charge of the clinical laboratories of the hospitals. The department has technical and clerical assistants available to assist the workers. There are limited funds for the purchase of animals, supplies and special equipment, and for technical labor.

Every physician must submit his research project, with an outline of material and equipment needed,

Fig. 1—West elevation of the Hixon Laboratory for Medical Research

Fig. 2—Corridor of basement floor

for the approval of the Director before he is allowed to work. The laboratory is open only to members of the faculty, out-patient and hospital staff members, and graduate students. Three full-time research fellowships are at present available, and plans are in prospect to continue these opportunities.

The laboratory is an oblong, five-story brick building 85 x 42 feet, recently erected at a cost of $149,944. Heat, light, and water are furnished by the central power plant. The floors are of terrazzo, and the partitions are constructed of glazed tile; all construction is entirely fireproof.

Basement

The basement floor is in the nature of a service section for the other departments and laboratories of the building. The main storeroom is in this section. At one corner there is a large room for sterilization and preparation of sterile supplies and distilled water. Adjacent to this room is the machine shop, where equipment is available for all types of metal and wood work. Next is the electric and radio shop, and beyond this is a room equipped as a physiological laboratory where most types of more technical physiological experiments can be carried out. This floor also contains a refrigerator room with a compartment regulated at 42° F. and another compartment regulated at 20° F. A photographic or dark-room is available. There are several rooms for animals, a large one for dogs, and smaller ones for mice, guinea pigs and rabbits. The dog room has a number of typical metabolism cages, and a compartment that will hold eight to ten animals; this communicates with the areaway at one side of the building, thereby providing a runway for those animals that are not in the cages. The animals in the dog room are usually under observation. Connecting with this room is a small treatment and injection room that has proved very convenient. Just across the corridor is a well-equipped operating room.

Fig. 3—Machine shop on the basement floor

Fig. 4—Physiological laboratory on the basement floor

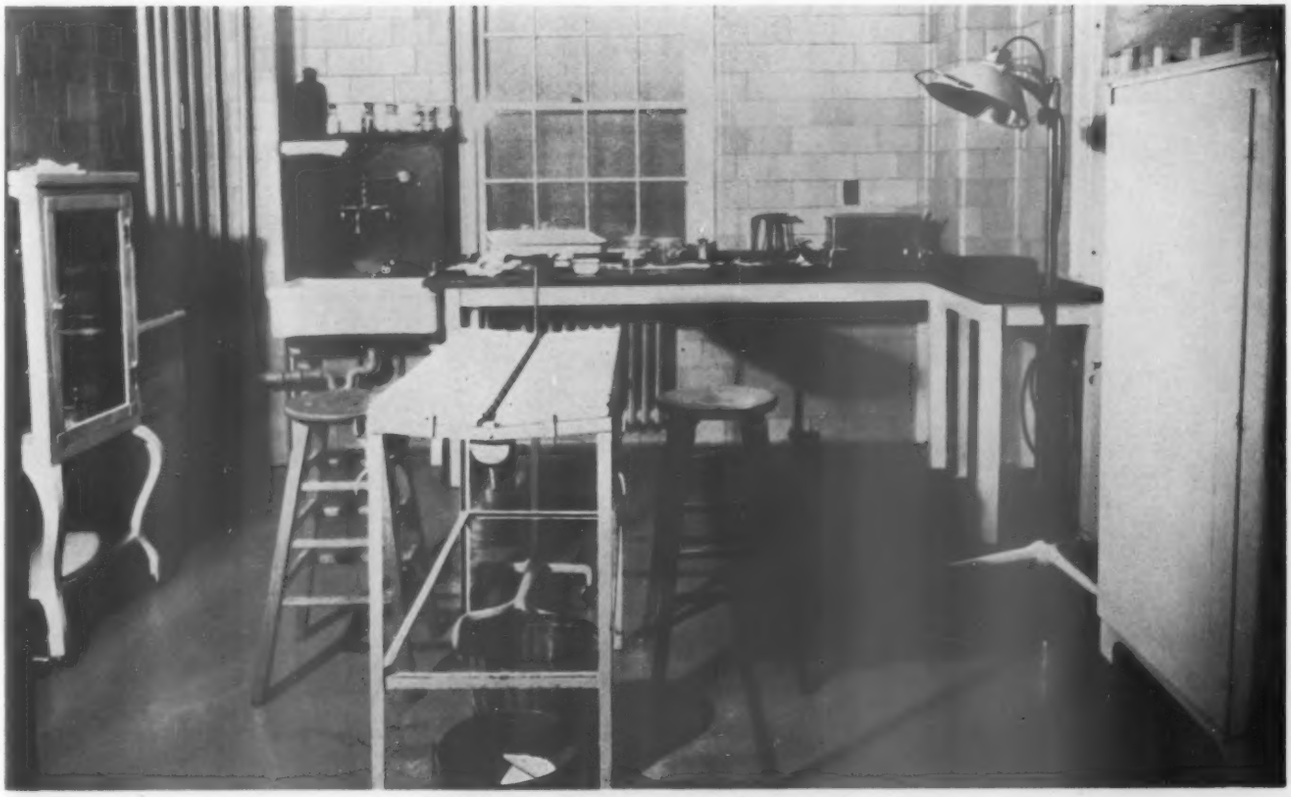


Fig. 5—Animal operating room on the basement floor

Main Floor

On the first or main floor are the offices of the Director and Assistant Director, and clinical laboratories as well as rooms for metabolism, hematological and bacteriological studies. A large, well-equipped biochemical laboratory communicates with the office of the Assistant Director, who is also a biochemist. On this floor many of the more difficult chemical problems of the hospitals are studied. In other words, these laboratories supplement the routine clinical laboratories of the hospitals.

Second Floor

On the second floor are a group of small individual research laboratories, and two larger rooms for bacteriological work. In one of these the bulk of special bacteriological work for the hospitals is being carried on. Adjacent is a preparation room for media, in which there is an air-tight compartment used for plating cultures. An incubator room is adjacent to this section. This floor also has a room for microchemical and histological work and a Kjeldahl room for nitrogen determinations. The bulk of the individual research work of the Hixon Laboratory is being done on this floor.

Third Floor

The third floor is unique in a building of this type, since it provides quarters for a beautifully equipped library and museum of medical history. The library is at one end of the floor in a room 40 x 20 feet, and is finished in walnut panel, providing a splendid reading room with hundreds of most valuable old medical works crowding the artistic shelves and vaults. In the center of the room is a fireplace built in to harmonize with the rest of the room and furnishings. Adjacent to the library are two rooms, one for the librarian, and the other a private study room suitable for those engaged in some particular problem in medical history. At the opposite end of the floor there is another large room of the same size as the library, completely equipped as a small lecture and seminar room. In the center of the floor there is another exquisitely finished room with walnut panels and display cabinets for a small museum of medical history. Here are many rare objects of medical art and history. The elevator and stairway open in the corridor just opposite the museum. This floor houses the valuable collection of books of medical history, because it is felt that research in medical history is fully as important in the development of medicine as research

Fig. 6—Library of medical history on the third floor

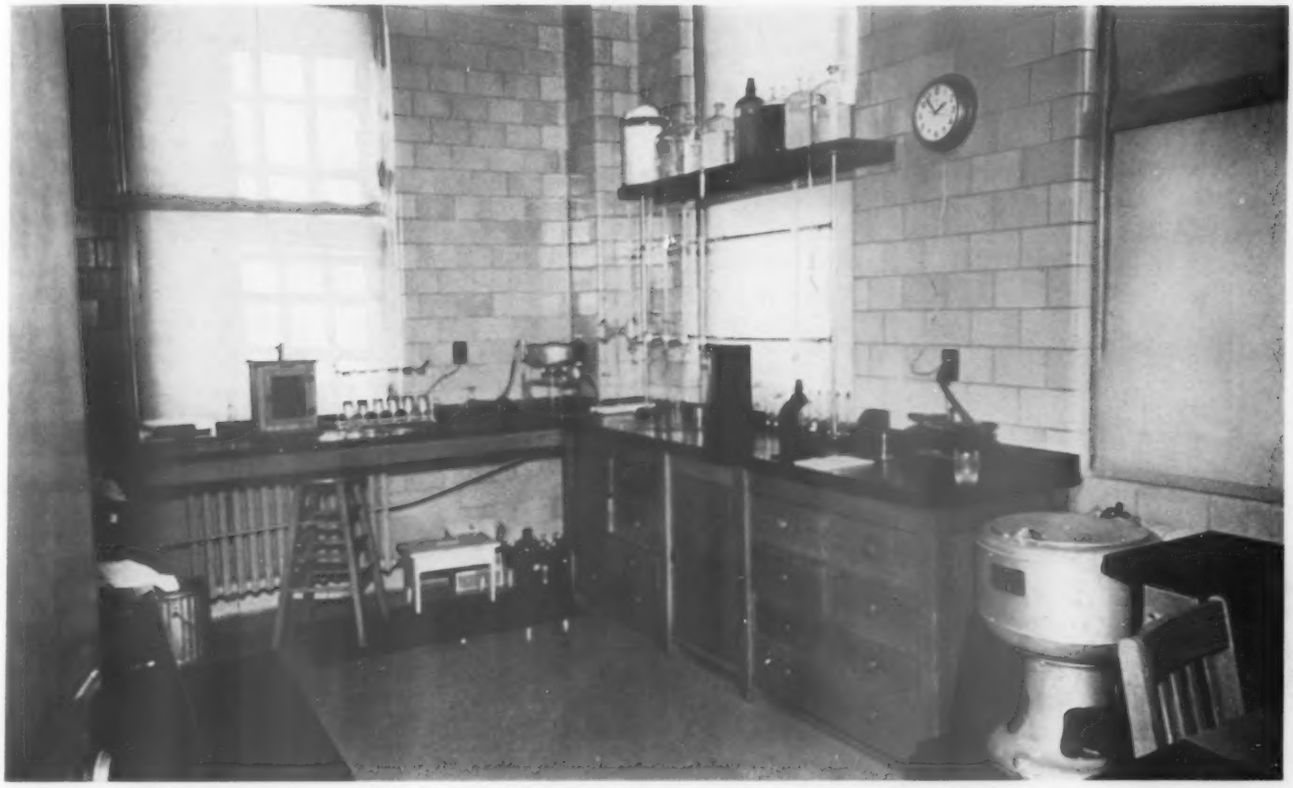


Fig. 7—Biological chemical laboratory on the first floor

Fig. 8—Assistant director's chemical laboratory on the first floor

Fig. 9—Seminar and lecture room of medical history on the third floor

in biochemistry, bacteriology, surgery, or any other medical sciences, and that the facilities for such investigations should be in the same building where other research workers are engaged.

Fourth Floor

The fourth floor is not completed. The rooms on one side of the building are to be devoted to the advanced study of Surgical Pathology, with approximately 100,000 specimens forming the basis for the work. This collection includes thousands of mounted slides, X-rays, and clinical histories all conveniently accessible for study.

The Roof

The roof has special quarters for dogs. A series of sixteen pens are so constructed (see Fig. 11) that each is separate and provides a sheltered, heated compartment, and an outdoor one, so that the animal can get out in the air and still be confined and under observation. Each stall has a runway and a sheltered compartment that is conveniently accessible to a heated corridor communicating with a preparation and feeding room. From the corridor a sliding door can be raised, permitting the dog to go out in the runway. Each stall has a false portable wooden floor. The floors of the pens drain into convenient floor drains in the corridor. The stone coping of the parapet wall of the roof is supported by a guard fence to prevent the dogs from jumping off the roof.

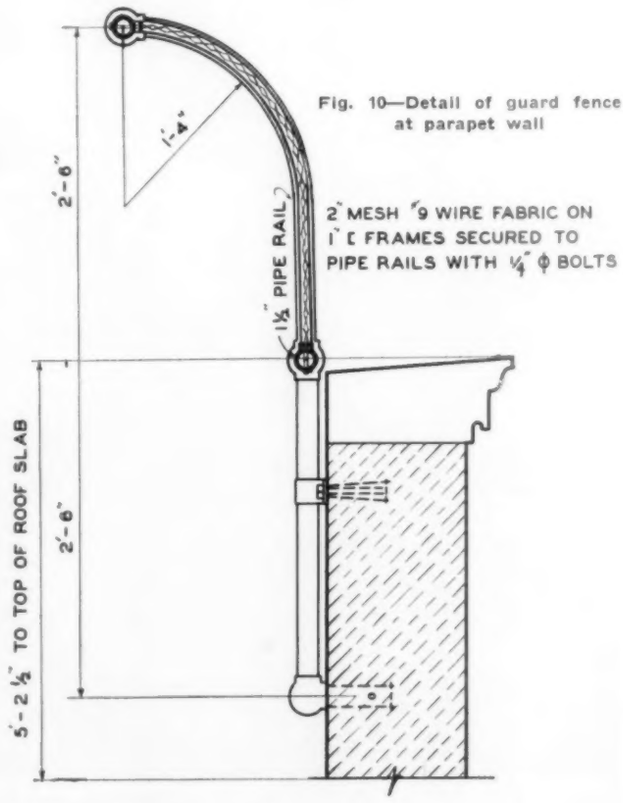


Fig. 10—Detail of guard fence at parapet wall

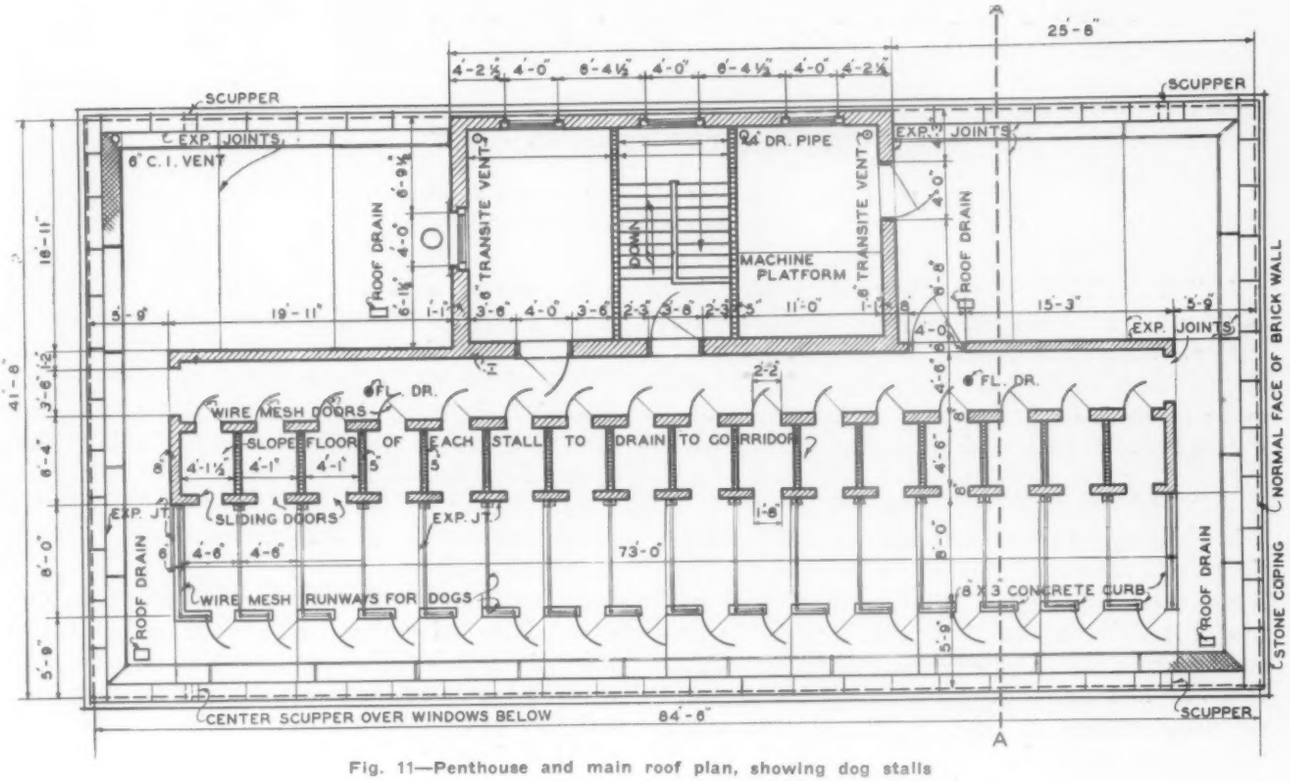


Fig. 11—Penthouse and main roof plan, showing dog stalls

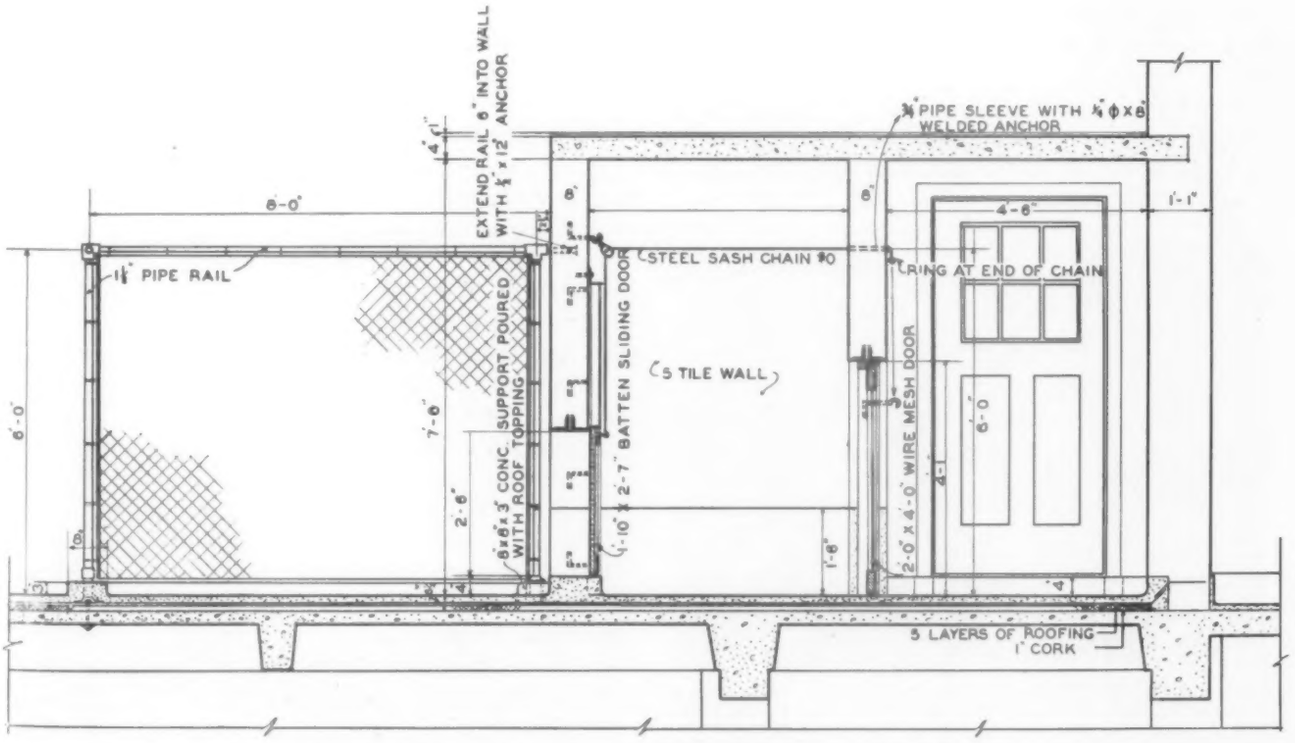

EXTEND RAIL 6" INTO WALL WITH ½" x 12" ANCHOR
¾" PIPE SLEEVE WITH ¼" ϕ x 8" WELDED ANCHOR
1½" PIPE RAIL
STEEL SASH CHAIN #0
RING AT END OF CHAIN
5 TILE WALL
2'-10" x 2'-7" BATTEN SLIDING DOOR
2'-0" x 4'-0" WIRE MESH DOOR
6" x 6" x 3" CONC. SUPPORT POURED WITH ROOF TOPPING
5 LAYERS OF ROOFING
1" CORK

Fig. 12—Details of dog stalls. Typical section (A - - - A) in Fig. 10

LABORATORY TABLES FOR A PHYSIOLOGY LABORATORY

By GEORGE EDWARD GAGE

Head, Department of Bacteriology and Physiology,
Massachusetts State College

CONSTRUCTION of nine new laboratory tables for the Physiology Laboratory of the Department of Bacteriology and Physiology, Massachusetts State College, for the first time makes available adequate facilities for independent student study of a wide range of physiological processes.

Facilities of the Four-Student Table

In planning for the construction and equipment for the typical table offering facilities for four students, it was necessary to plan for the bringing together of special facilities in a relatively small space. As constructed, each table now contains outlets for both alternating and direct current electricity, compressed air under constant pressure, gas, hot and cold water, and drainage facilities.

The two sinks in each laboratory table are constructed entirely of pyrex glass. This for the first time prevents the inevitable staining of sinks which occurred when other materials were employed. The sinks may be quickly and thoroughly cleaned with acid which will remove any material adhering to the walls.

The inclusion of compressed air at constant pressure makes possible the operation of respirators by each student so that life processes may be studied under varying conditions.

Placing of tables is illustrated here, showing how free access is available to each student. The instructor's table in the background is raised above the student tables so that all may watch experiments being conducted without leaving their seats. The instructor's table is equipped with the same facilities as the student tables. (Construction details are shown on the plans on the opposite page)

Direct current is available, through the use of power packs, in several voltages for use in neuromuscular physiology.

Outlets for all facilities for each table are led through a single 7-inch hole driven through the floor directly under the center of each table. This method makes for neatness and efficiency in the laboratory itself. Similar outlets, now covered by brass screw-plates, provide for the addition of six more tables as funds are available.

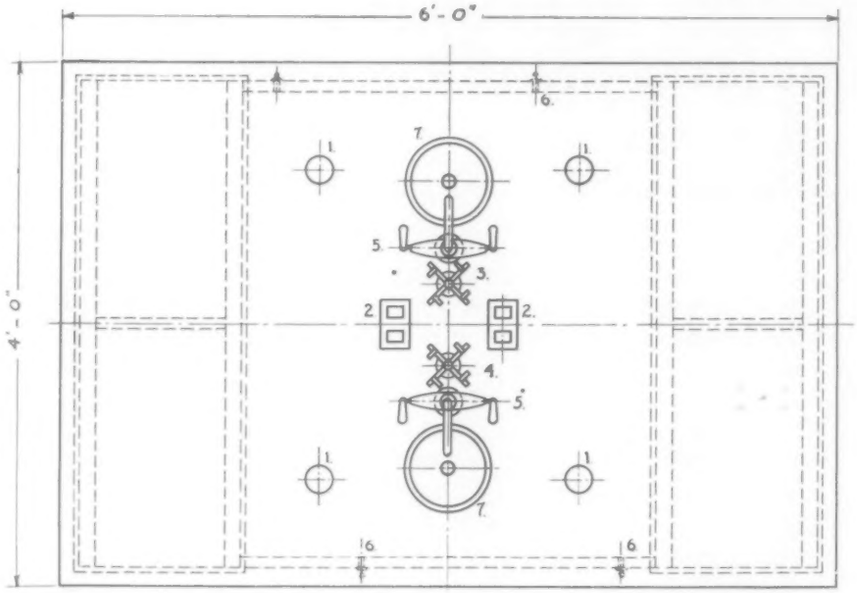
An instructor's table, mounted well above the student tables, and equipped with the same facilities as the other individual laboratory tables, makes it possible for the instructor to demonstrate experiments in full view of all the students using the same facilities which each one of them has before him.

A rough construction plan of the student laboratory table is shown, as well as a diagram illustrating the outlets of the various facilities on the table top. The tables themselves are constructed of oak and the top is constructed of wood especially prepared to render it acid-proof.

Location of the Tables

Considerable planning was necessary in arranging the laboratory tables to accommodate the maximum number of students and still allow free access to each table. As arranged at present, the instructor can go directly to any student to give necessary instruction or assistance. The tables are so located in the center of the room that they constitute an independent unit for instruction of undergraduates. A secondary series of tables along the wall accommodates graduate students whose apparatus sometimes must remain in place for a period of several days, thus making these tables unavailable for the use of undergraduates. The laboratory will provide places for ten graduate students and thirty-six undergraduate students at one time without confusion. With the completion of six additional tables sixty undergraduates may be accommodated at one time.

It is realized that the laboratory is still far from perfect in arrangement, but we feel that the planning and thought which went into the construction of these present laboratory tables brings the room to its highest theoretical efficiency.



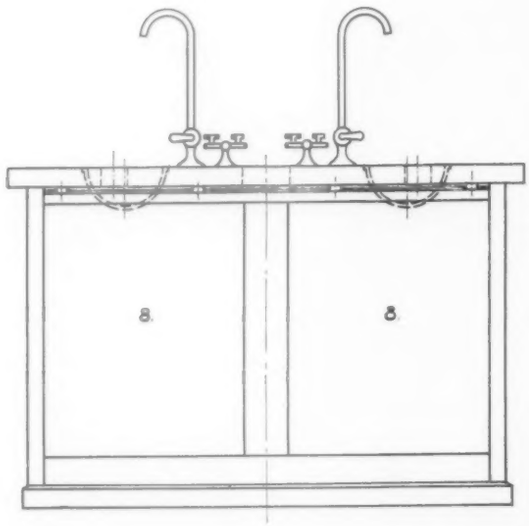
Left—Plan of top of desk

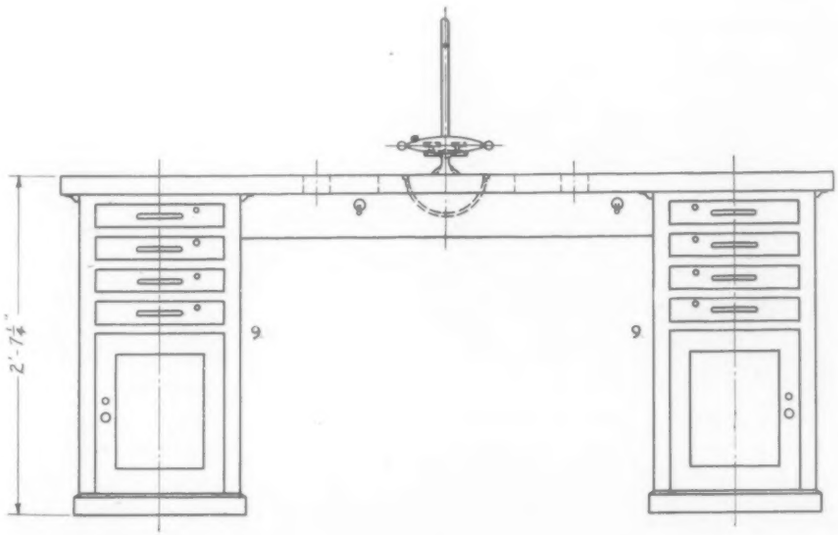
Below—Side elevation

LEGEND

(Note: desk designed for four students)

1. Four lamps for microscope flush with top
2. Double-outlet receptacle
3. Four-way gas connection
4. Four-way compressed air connection
5. Cold water
6. Switches for microscope lamps
7. Glass sinks
8. Panel on both sides of drawer sections
9. Both sides of table furnished with drawers and cupboards





Construction details of a laboratory desk designed for micro-biology classes at Massachusetts State College

Left—Front elevation

NEW GREENHOUSE EQUIPMENT AT THE MASSACHUSETTS STATE COLLEGE

By CLARK L. THAYER

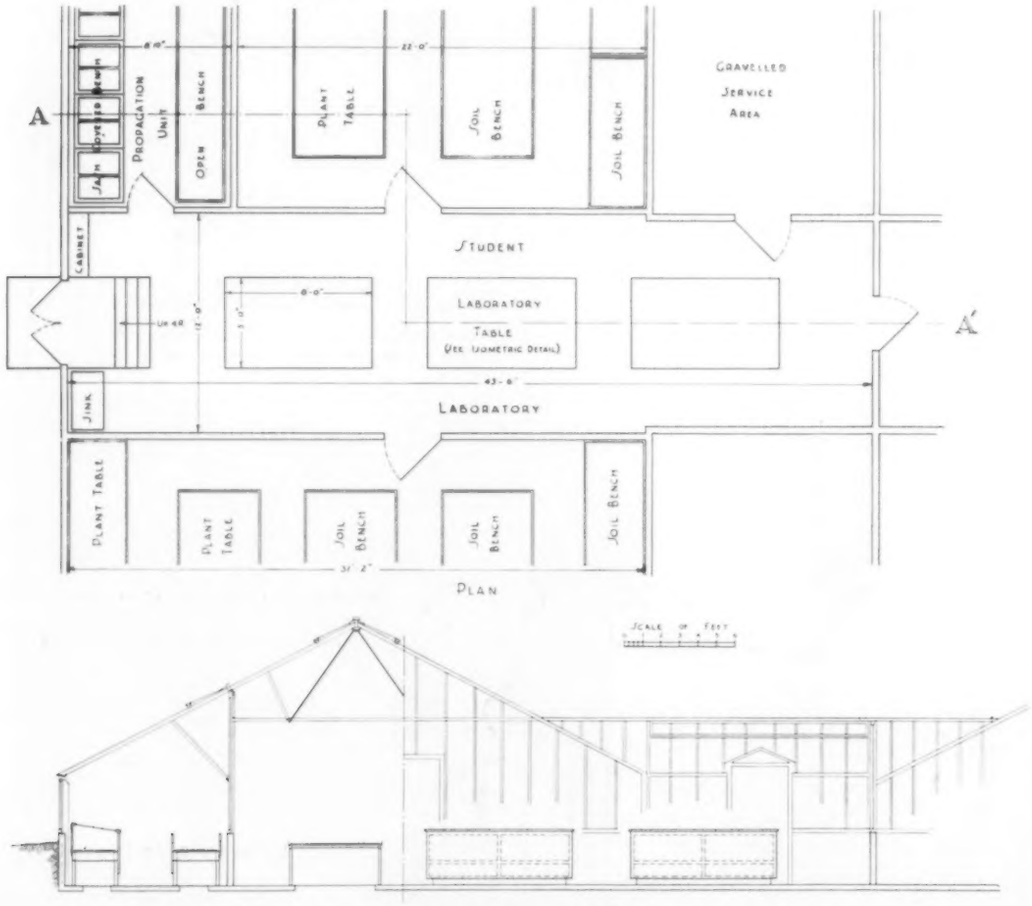
Head, Department of Floriculture, Massachusetts State College

DURING the past summer a greenhouse 32 feet wide and 112 feet long was erected on the campus of the Massachusetts State College for use by the several departments of the Division of Horticulture. It replaces a greenhouse which was seriously damaged during the disastrous hurricane of September 21, 1938.

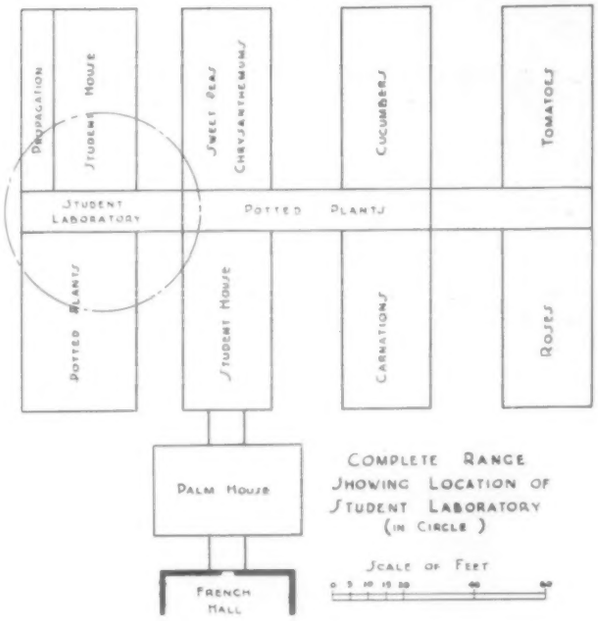
During the present school year approximately one hundred students in courses in Plant Propagation will make use of the facilities provided by the new structure. Students in other courses in Floriculture, Forestry, Landscape Architecture, Olericulture, Plant Breeding, and Pomology will profit by this valuable addition to the equipment of the college.

The house consists of two units, each 32 feet wide and 50 feet long, on either side of a corridor 12 feet wide and 44 feet 6 inches long, which connects the new structure with the existing range of the Department of Floriculture. In one unit a section approximately 9 feet wide and running the length of the unit on the north side was partitioned off to provide two benches for use in plant propagation. Frosted glass was placed in the partition to reduce the amount of light entering this section. The space under both benches is enclosed to provide for retaining bottom heat. Sufficient radiation was installed to allow for a temperature of 80° F. with an outside temperature of 0°; each coil is valved separately so that as little or as much bottom heat may be obtained as is desired for various kinds of plants. Also, the house is so piped that heat is available in this propagating section when it may not be needed in other units. Overhead connections make it possible to use electricity as a source of heat in the benches when it is desired for experimental purposes. When these connections are not being used, the sockets are closed with screw caps which prevent injury from moisture. One bench is equipped with sash covers so that high atmospheric temperature and humidity may be maintained with high sand temperature.

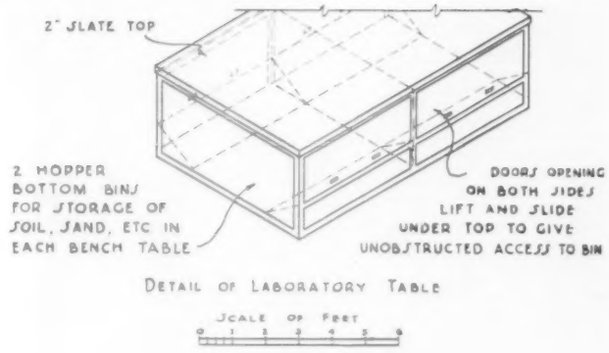
One bench in each 50-foot unit is made up of sections each approximately 8 feet 4 inches long. The sections may be placed on shorter legs or may be removed entirely to provide greater head-room for plants.



Plans showing details of construction



The corridor or connecting house is the most unusual feature in the new construction. Under normal conditions the student would do certain parts of the laboratory work in French Hall, the classroom building (see plan), but with this new unit all work will be done in the greenhouse; in other words, the greenhouse becomes the laboratory. Temporary wooden tables, covered with Masonite to provide a smooth working surface, are now in use, but special tables have been designed which will be installed in the future (see plan). Frosted glass in the roof reduces the amount of sunlight and thus assists in making conditions more agreeable for work during warm days.


2" SLATE TOP
2 HOPPER BOTTOM BINS FOR STORAGE OF SOIL, SAND, ETC IN EACH BENCH TABLE
DOORS OPENING ON BOTH SIDES LIFT AND SLIDE UNDER TOP TO GIVE UNOBSTRUCTED ACCESS TO BIN
DETAIL OF LABORATORY TABLE
SCALE OF FEET

CURRENT DISTRIBUTION FOR SCIENCE ROOMS IN HIGH SCHOOLS

By JOHN A. CLARK

Chairman of the Standing Committee on Science for the High Schools of New York City

THE increasing emphasis upon instruction in science in secondary schools has produced many problems of equipment. None is more important than that of providing science rooms with an adequate number of controlled electric circuits and suitable outlets.

With the introduction of a countless number of teaching devices in the various departments of science each of which makes use of current, a wide choice of voltages must be provided. Further provision must be made for a wide range of current densities. The problem in large city schools is further complicated by the fact that as many as twenty rooms on three or four floors must be supplied with currents of various kinds and quantities at the same time.

Basically, the problem is met by using a commercial source of 120 volts A. C. coupled with a flexible motor generator, a bank of storage batteries and a charger. But, given an adequate source, there remains the perplexing problem of a distribution sufficiently flexible to meet such a wide variety of needs and still keep within reasonable bounds in the matter of expense. In this connection it must be remembered that the element of safety for both pupil and teacher is one of major importance. All features which may be construed as hazards by those who would prosecute a suit for damages must be eliminated as far as possible.

To conserve the time of both teacher and pupil and to add to the effectiveness of a learning procedure, ease and definiteness of control and, above all, flexibility become of major importance. Flexibility is often required both at the source and within the science room. For a very small school a self-contained unit may be used in a demonstration room with leads to the laboratory. Fig. 1 shows one form of a highly flexible unit which is adequate for the purpose. The batteries were not in place when the photograph was taken, but the bank of terminals for them appear on the face of the panel. All circuits are provided with the male and female type of sockets, and the nonconducting collars protecting the positive and negative

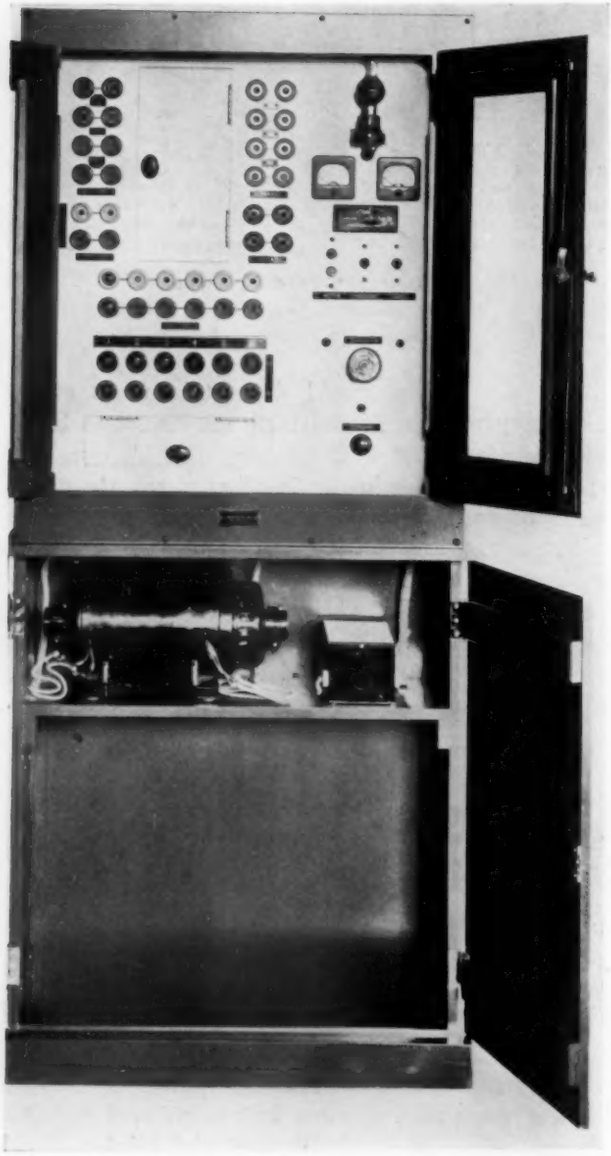
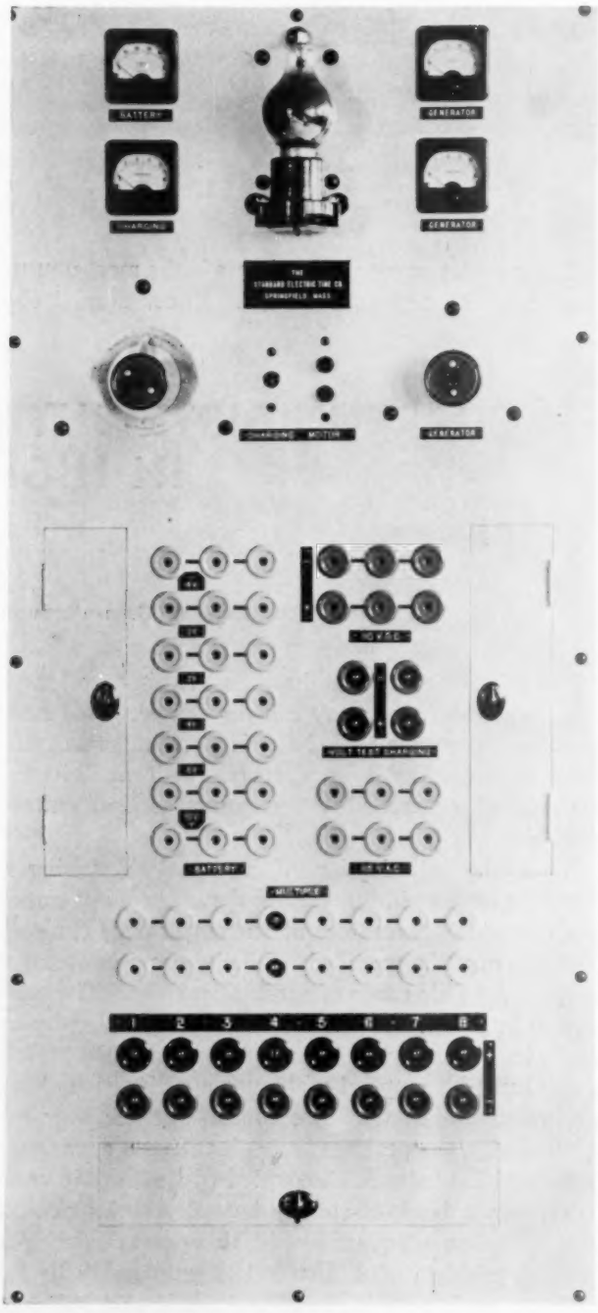


Fig. 1 (left)—A highly flexible panel-board unit which is suitable for use in a small school

Fig. 2 (below)—This panel, designed for use in a medium-size school, provides adequate space behind the lower panel doors for the storage of jacks and cables



Photos by courtesy of Standard Electric Time Co.

terminals are in contrasting colors. By using the long form of jacks, the panel is "dead front" and practically mischief-proof.

For larger schools, distribution panels of appropriate sizes are installed along with the basic sources in a science preparation room. These panels are provided with suitable flexible resistors. Thus any room may be supplied with a wide range of current densities and a variety of voltages. Fig. 2 shows a panel designed for a school of medium size. Note that the charger is mounted on the face of the panel. The lower panel door provides adequate space for the storage of jacks and cables. Fig. 3 shows a panel designed to meet the requirements of a large school, 4,000-4,500 pupils.

In large schools the most important unit in the electrical system is the special panel in the physics demonstration (lecture) room. Fig. 4 shows one

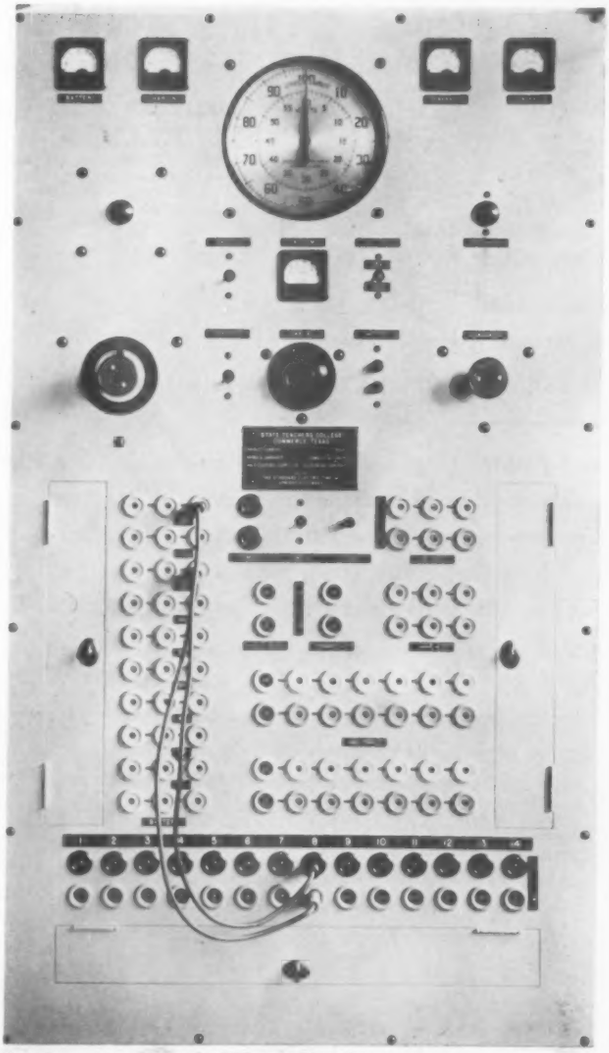


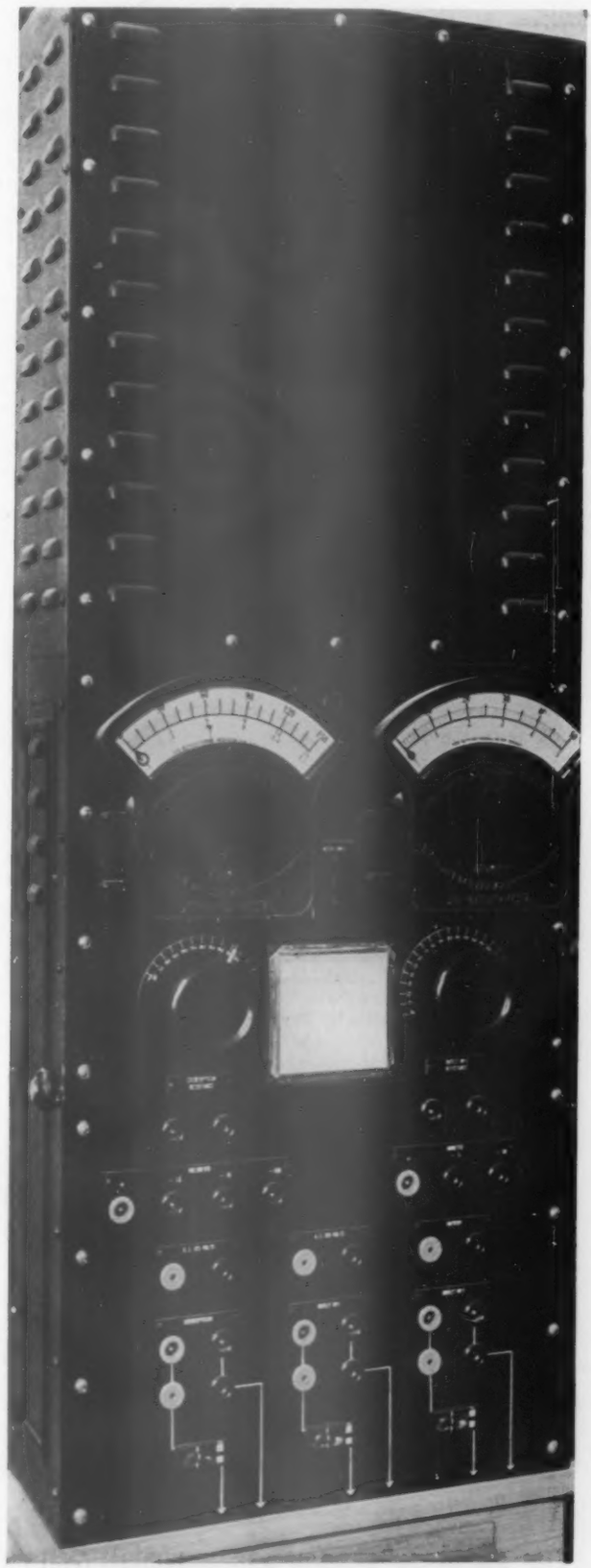
Photo by courtesy of Standard Electric Time Co.

Fig. 3—A panel for a large school

form, now standard equipment, designed for the high schools of New York City. In order to secure as great a flexibility as possible when used with the central panel, two resistors of adequate capacity are installed in a ventilated case above the panel. One of them makes possible controlled currents up to 50 amperes in about equal steps. The other one is used for a wide variety of experiments. The large-faced meters may be used either with the circuits, or by means of a feed-back circuit to the lecture table, with the apparatus on the table. Suitable shunts with controls give the illuminated scale of the meters three ranges. Each circuit is provided with quick-acting circuit breakers. This panel is not only "dead-front" when in use but completely out of circuit when not under control of the instructor. For good visibility the meters are located at the level of the top of the blackboard.

Fig. 4 (below)—Panel in physics demonstration room of Lafayette High School, Brooklyn, N. Y., designed by Electrical Division of Board of Education of New York City

Photo by courtesy of Weston Electrical Instrument



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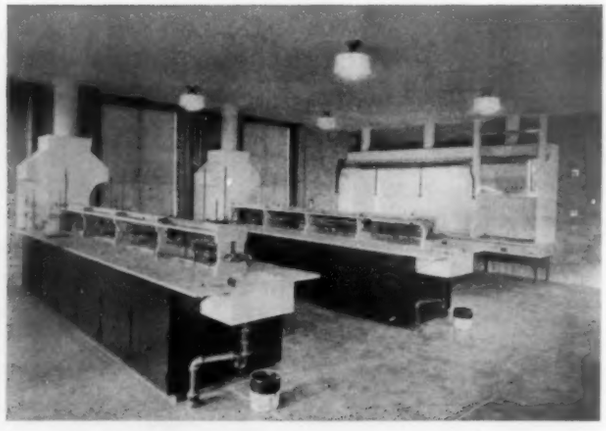
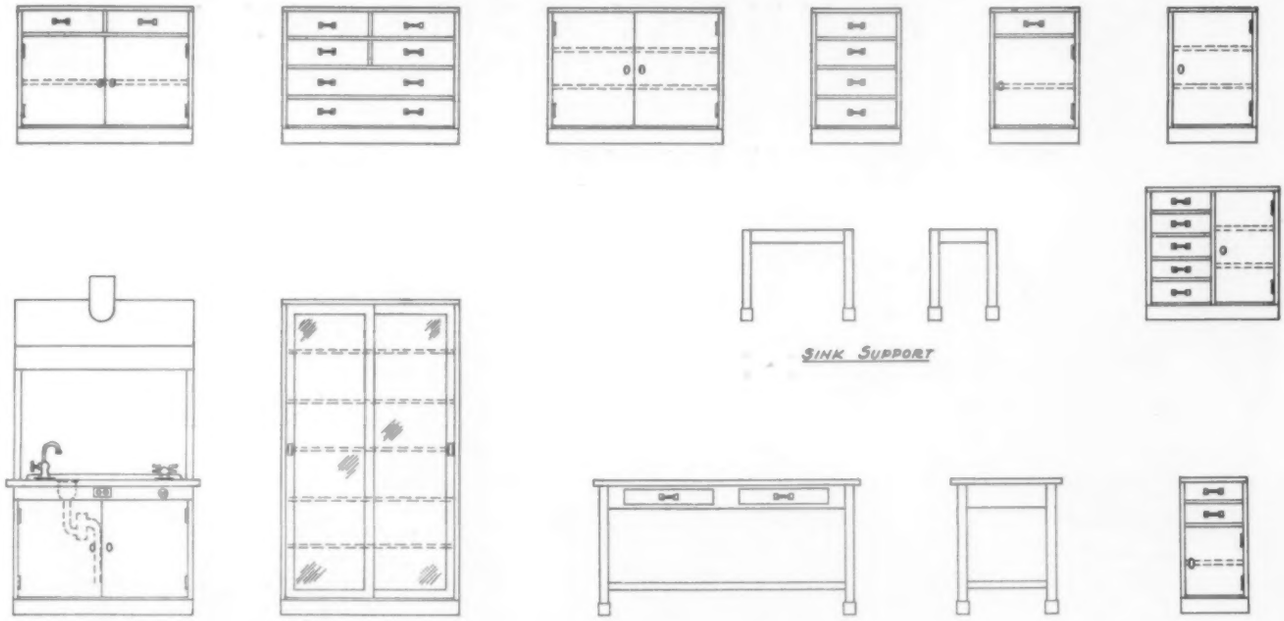


Organic Chemistry, Ursinus College



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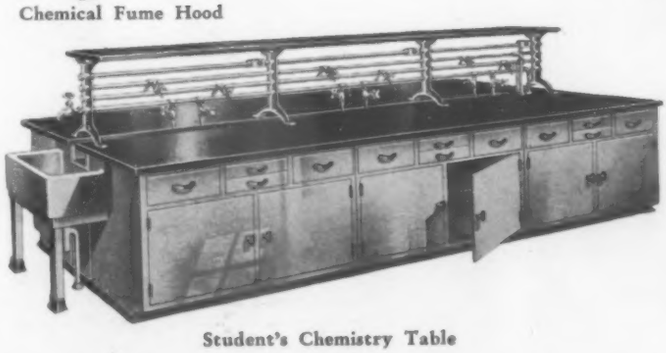
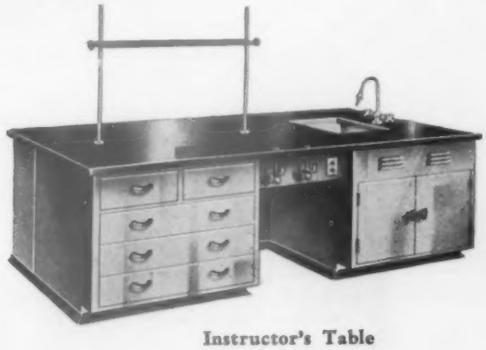


Student's Chemistry Table



Instructor's Table

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This natural stone is becoming extremely popular. Its great resistance to weather action makes it desirable for exterior as well as interior work. When sand-blasted (as in spandrels) the fine tracery of the designs stands out against the polished black surface.

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An interesting addition to the line. In honed finish, shows clear white markings. Polishes to a dark green.

PHYSICAL AND CHEMICAL PROPERTIES

All grades of Alberene Stone are homogeneous and finely granular in all directions, dense and non-stratified, chemically resistant, impervious and non-staining. Alberene soapstone is easily machined—bored, slotted, grooved, tongued, turned—without splitting or spalling. Use of thin sections (⅞ in.) makes for economy.

METHOD OF CONSTRUCTION

Alberene laboratory fixtures are practically one piece structures of solid stone. Table top slabs are united by a practically invisible joint employing a strip of non-corrosive metal cemented in grooves, with abutting slab edges sealed with acid-proof cement. Fume hoods, sinks and tanks are assembled with tongue-and-groove joints held by hidden bolts and nuts and cemented—permanently gas and liquid tight.

SERVICE IN DESIGN AND INSTALLATION

Every laboratory of major importance equipped in the past 40 years has used Alberene soapstone wholly or in large part. Out of this experience the company offers an advisory service, freely available to school and university authorities and architects.

MANUFACTURING FACILITIES

Quarries and mills at Schuyler, Virginia, are the largest in the world devoted exclusively to the production and fabrication of special purpose stone.

Section of Chemical Engineering Laboratory, Rensselaer Polytechnic Institute, Troy, N. Y.

Virginia Alberene Stone Stair Treads and Platforms in Woodrow Wilson High School, Washington, D. C. Nathan C. Wyeth, Municipal Architect.

GENERAL CERAMICS COMPANY

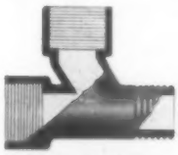
Manufacturers of Acid-Proof Chemical Stoneware, Laboratory Equipment

30 Rockefeller Plaza, New York, N. Y.

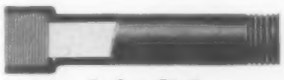
Buffalo Chicago Los Angeles Portland San Francisco Seattle Tacoma Spokane Montreal

The Chemical Stoneware Division of General Ceramics Company makes a complete line of acid-proof chemical stoneware equipment for chemistry and physics laboratories in educational and research institutions, for general industrial chemical purposes, and for hospitals, electro-plating plants, newspapers, photo-engraving shops, and other establishments where corrosive fluids are used.

General Ceramics Chemical Stoneware Laboratory Equipment is widely used in educational institutions throughout the country. In fact, a list of the colleges and universities with chemistry laboratories equipped with General Ceramics Chemical Stoneware is practically a roster of our leading institutions of learning, including among many others Yale, Harvard, Vassar, Radcliffe, Duke, Pittsburgh, Wesleyan, Lehigh, Tulsa, Toledo, Berea, Purdue, Vanderbilt, McGill, California Institute of Technology, and the Universities of Maryland, Illinois, New Hampshire, Connecticut, Indiana, Pennsylvania, Ohio, Wisconsin, Nevada, California, and California at Los Angeles. General Ceramics equipment is used also in such buildings as the Walter Reed Hospital in Washington, the Curtis Publishing Company Building in Philadelphia, and in New York, the Times Building, Metropolitan Life Building, and United States Assay Office.



TY Fitting



Socket Pipe

Quarter Bend

Description

General Ceramics Chemical Stoneware is a dense granite-like material with an attractive glazed surface. Both the glaze and the body of the ware are completely impervious to all acids and other chemicals, excepting hydrofluoric acid. The surface glaze is an integral part of the ware itself and therefore free from crazing and cracking. General Ceramics ware is mechanically strong, leakproof, and easy to keep clean, and it cannot contaminate the chemicals handled. It lasts indefinitely and there is no upkeep or replacement expense.

Laboratory Sink with integral back and side. Can be furnished without back and side in various types and sizes as required

Laboratory Sink with double drainboard. Can be furnished also without the integral back, with single drainboard (either right or left), and with details of construction as required

The General Ceramics line of stoneware equipment includes laboratory sinks, drain lines and fittings, sumps, fume ducts, pumps, ventilating fans, and countless other items.

Engineering Service and Catalogues

Our Engineering Department will gladly assist in selecting the right stoneware equipment for any requirements. We cooperate in laying out laboratories and other buildings where corrosive products are handled, also in the design of special chemical apparatus. New bulletins on General Ceramics Laboratory Sinks and on Acid-Proof Pipe and Fittings will be furnished on request.

Specifications

Specifications should read as follows: "All parts of this installation subject to the action of acids or acid wastes are to be made of high-grade acid-proof chemical stoneware manufactured by the General Ceramics Company of New York."

MAURICE A. KNIGHT

Acid, Alkali and Corrosion Proof Chemical Stoneware

227 Kelly Avenue, Akron, Ohio

55 West 42nd St., New York, N. Y.
917 Fidelity Bldg., Cleveland, Ohio
903 United Bldg., Niagara Falls, N. Y.
314 Stephenson Bldg., Detroit, Mich.
1934 Gravois, St. Louis, Mo.
203 N. Wabash Ave., Chicago, Ill.
1033 Merchants Exchange Bldg., San Francisco, Calif.
3465 Marlowe Ave., Montreal, Quebec, Can.

PRODUCTS

Acid Waste Pipe and Fittings
Acid-Proof Fume Ducts
One-Piece Laboratory Sinks
Acid-Proof Table Troughs
Neutralizing Sumps
Tanks, Jars, Filters, etc.

KNIGHT-WARE "IT IS THE BODY ITSELF"

SOME INSTALLATIONS

Akron University
McGill University
Purdue University
Ohio State University
Brooklyn College
Wellesley College
Sarah Lawrence College
University of Arkansas
University of California
University of Washington
University of West Virginia
Mellon Institute of Industrial Research

KNIGHT-WARE

Knight-Ware is an improved ceramic material that is dense, tough and wholly inert to the action of chemical solutions or gases, weak or strong, hot or cold (Hydrofluoric acid and hot caustic solutions excepted). Its acid-proof quality does not depend upon any glaze or surface treatment. "It is the body itself" that is entirely acid-proof. Knight-Ware equipment, properly installed, is trouble-free and permanent.

LABORATORY SINKS

Knight-Ware sinks are custom-made to specified measurements without extra cost. The one-piece construction, smooth surfaces, rounded corners and acid-proof quality mean a freedom from leaks and a cleanliness that is permanent. Splash backs, drainboards, aprons and outlets of several styles may be had as integral parts of the sink. Bottoms are sloped to insure complete drainage. The finish is a rich brown salt glaze that will not stain or peel.

ACID WASTE PIPE AND FITTINGS

Knight-Ware pipe and fittings are made in standard designs in any bore from 1 to 60 inches and straight lengths up to 5 feet. Special pieces to fit unusual places or to eliminate extra joints are available at low cost. Knight-Ware pipe is light in weight, strong and acid-proof.

Joints, packed and poured to our specifications, are tight and lasting.

PressureFlex, our new type rubber joint, provides a positive seal with a minimum of time and labor.

KNIGHT-WARE FUME DUCTS

Ventilating pipe is available in round or rectangular shapes in bores up to 60 inches and with bell and spigot, flanged or plain butt end connections. Specify Knight-Ware for lasting protection.

SERVICE

If you are planning a new laboratory or modernizing your present one, we offer our knowledge and practical experience gained from scores of Knight-Ware installations.

Our fully illustrated Laboratory Equipment catalog will be sent upon request.

Fig 237 RD Sink with right hand drainboard. Available with left hand or double drainboards and apron.

275A Table Trough

268 Knight-Ware S-Trap with Cleanout

THE DURIRON COMPANY, INC.

North Findlay Street Dayton, Ohio

American Schools and Universities are big users of

DURIRON ACID PROOF DRAIN PIPE

Recent Installations

New York University
State College of Pennsylvania
University of Indiana
Columbia University
Johns Hopkins
California Institute of Technology
University of Puerto Rico
The Citadel
University of North Carolina
Duke University
Purdue University
University of Louisiana
University of Houston
University of Idaho
Oregon State College
and more than 3,000 high schools

Many architects, as a result of their vast experience, specify that Duriron Acid Proof Drain Pipe and Fittings be provided for laboratory drainage and other corrosive wastes.

Many schools, where Duriron wasn't installed originally, have put in Duriron Acid Proof Drain Pipe and Fittings when the drain lines have to be replaced.

The logic is simple, of course: Duriron Acid Proof Drain Pipe and Fittings installed for handling corrosive wastes will outlast the building; the cost per year of usage is unusually low; there is no risk of drain line failure; Duriron can be installed by any experienced plumber at the same labor cost as that for extra heavy cast iron soil pipe.

Duriron goes to the schools—for service: the schools and universities come to Duriron—for service.

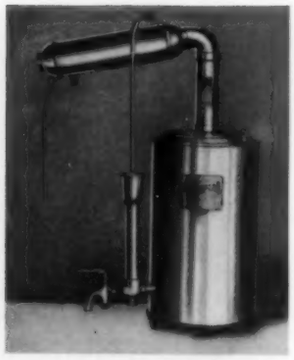
BARNSTEAD STILL AND STERILIZER CO., INC.

15 Lanesville Terrace, Forest Hills, Boston, Mass.

Original "BARNSTEAD" Water Distilling Equipment

Standard Water Stills for Laboratories
Extra Duty Stills for Hard Water Service

Storage Tanks for Distilled Water
Complete Line of Mountings and Accessories



1 gallon per hour electrically-heated still

1 gallon per hour steam-heated still

For more than 60 years, Barnstead Stills have been the outstanding laboratory water stills. Over 30,000 are now in use. Such Barnstead features as counter-current condensation, hot well and condenser venting, raw water preheating, splash proof baffles, extra large evaporators and pure block tin linings insure the highest grade of distillate. Copper and brass construction and the finest heating elements obtainable provide maximum efficiency and lowest operating and maintenance costs.

Finished in highly polished* nickel, Barnstead Water Stills conform with other laboratory equipment. Their sizes range from ½ gallon per hour up. Operation is by gas, steam, electricity or kerosene.

Extra Duty Stills for Hard Water Service

With the same capacities and operating elements as the Standard Models, Barnstead manufactures Extra Duty Type Stills for distilling water that is either badly contaminated or analyzes more than 50 parts per million total hardness. These stills have evaporators with extra large disengaging space to take care of excessive foaming and a constant bleeder device to prevent rapid scale formation in the evaporator.

Mountings and Accessories

Barnstead Stills can be mounted on stands, wall brackets, tables, shelves or concealed behind a wall. They are sold with or without storage tanks—metal or wood, tin lined—in many sizes. A full line of automatic cutoffs as well as self-starting, self-stopping and self-flushing controls are available. Write for complete 70-page catalog.

* Aluminum bronze finish over 3 gals. per hour.

1 gallon per hour gas-heated Extra Duty Still

Barnstead Still with storage tank and stand

STILLS FOR LABORATORIES—STANDARD AND EXTRA DUTY TYPES

STEAM-HEATED

Capacities 1, 2, 5, 10, 15, 20 and 30 gallons of distilled water per hour. All sizes are also furnished in the Extra Duty or hard water type. Evaporators are fitted with steam-heated coil. Steam at 40-60 pounds pressure should be used to heat Still. Stills to operate on lower pressures furnished to order. Require 9 pounds of steam and 8 gallons of cooling water per gallon of water distilled. Very economical in operation. Larger sizes up to 500 gallons per hour. When ordering, specify capacity required in gallons per hour, your steam pressure and type desired (standard or Extra Duty).

GAS-HEATED

Capacities ½, 1, 1½, 2, 2½, 5 and 10 gallons of distilled water per hour. Also Extra Duty models (for hard water) in all sizes. Stills are furnished complete with built-in gas burner and mixer. Flame is encased for high efficiency. Burners are adjustable for gases of 450 to 1100 B.T.U. value per cubic foot. Burners for other gases furnished to order at no extra charge. Require 9600 B.T.U. of gas heat and 8 gallons of cooling water per gallon of distilled water. When ordering, state capacity required in gallons per hour, kind of gas, and type desired (standard or Extra Duty).

ELECTRICALLY-HEATED

Capacities ½, 1, 1½, 2, 3, 5 and 10 gallons of distilled water per hour. A set of totally immersed electric heating elements permit very efficient heating. Elements are replaceable. The Stills are regularly furnished to operate on 110 or 220 volts alternating or direct current as specified. Require 2600 watts of electricity and 8 gallons of cooling water per gallons of water distilled. Very widely used in laboratories. When ordering, specify capacity required in gallons per hour, your voltage, and type desired (standard or Extra Duty).

THE EATON-DIKEMAN COMPANY

Manufacturers of Filter Papers

Mount Holly Springs, Penna.

LABORATORY FILTER PAPER FOR SCHOOLS, COLLEGES AND INDUSTRIES

FOR USE IN HEAVY AND LIGHT FUNNEL WORK, FILTER PRESSES AND FILTER MACHINES

Made with pure spring water

The Eaton-Dikeman Company was established in 1893 and is today the world's largest manufacturer of qualitative and industrial filter papers.

Forty diversified grades of uniform quality are made under strict laboratory control in a mountainous locality free from industrial aerial pollution.

Each grade was created to meet exact requirements of the liquid to be filtered.

The high standard quality of the E&D filter papers is acquired by the use of the best obtainable raw materials, from which our filter papers are made, under the careful supervision of laboratory experts. Analysis of the spring water used in making our filter papers shows it to be nearly as pure as distilled water. This assures you that the E&D filter papers are free from chemicals and salts that would be injurious to the filtered products.

ASK FOR THE E&D LABELS

Eaton-Dikeman Laboratory Papers are sold by all laboratory supply dealers under their own special labels as well as under the E&D labels. To be sure of getting E&D quality it is best to ask for the E&D label.

Some of the liquids filtered with E&D products are mineral and vegetable oils, varnishes, paints, all alcoholic and non-alcoholic beverages, sugar, perfumes, extracts, drugs, chemicals, soaps, glue, ink, fruit juices.

E&D Folded Filter Papers with uniformity and purity plus precision and speed. Two grades stocked in all standard sizes 12½ cm to 60 cm. No. 192 rapid yet retentive, No. 193 medium fast, very retentive. Exceptionally strong and will retain the fold while in the funnel. With the full rounded apex permits an even distribution of the load preventing breakage at the apex.

The folded papers can be supplied in twelve different grades to meet the requirements in the industrial as well as the laboratory field.

Packed 100 in a box. Samples sent upon request.

Filter Paper Clippings free from dust and grease are recommended to manufacturers of pharmaceutical, biological products in filtering machines, etc.

E&D Bibulous Paper with good absorbent quality recommended for drying bacteriological slides, etc., supplied in sheets any size or books of fifty sheets 4″ x 6″ with advertising matter on covers.

E&D Lining Paper, white or granite color, prevents glassware breakage and absorbs spilled liquids when placed in drawers and on shelves.

E&D Qualitative Filter Papers in all sizes up to 20″ diameter packed 100 circles in a box.

PHYSICAL CHARACTERISTICS OF MOST POPULAR LABORATORY GRADES

Grade	Color	Surface	Texture	Rapidity cc. per Min.
607	White	Smooth	Med. Close	35-50
609	White	Smooth	Med. Close	30-45
612	White	Embossed	Med. Close	20-35
613	White	Smooth	Very close	15-35
615	White	Creped	Fairly Open	75-150
617	White	Creped	Open	150-250
619	Gray	Creped	Fairly Open	75-150
620	Gray	Embossed	Fairly Close	45-70
629	White	Smooth	Med. Close	50-75

Note: Rapidity is number of cubic centimeters of distilled water filtered per minute in a 4″ 60° funnel.

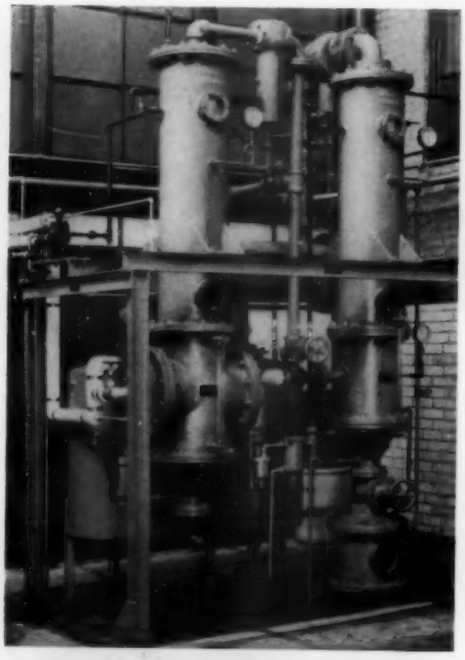
F. J. STOKES MACHINE COMPANY

5960 Tabor Road (Olney P. O.), Philadelphia, Pa.

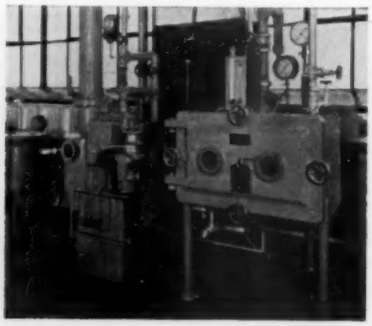
Representatives in New York, Chicago, Cincinnati, St. Louis Pacific Coast Representative — L. H. Butcher Company, Inc.

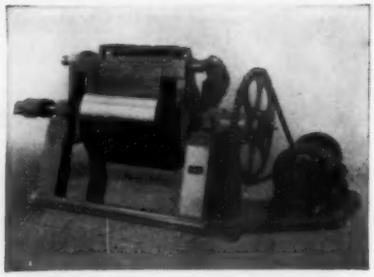
SPECIAL EQUIPMENT FOR TEACHING AND RESEARCH ACTIVITIES

Double-effect evaporator as installed in the laboratory of the University of Pennsylvania. Arranged so that either effect can be operated independently. Second effect arranged for crystallizing



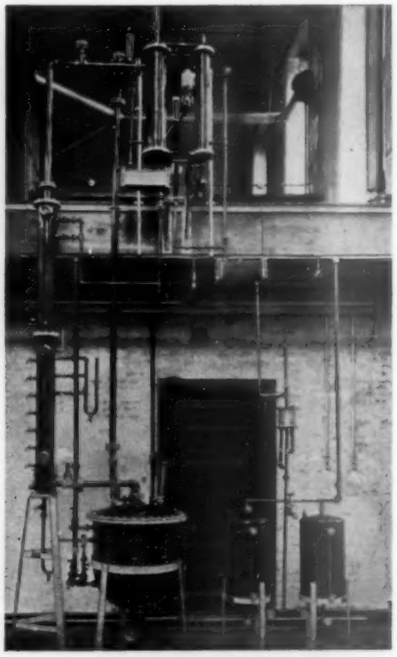
Below: **Complete Laboratory Installation of Vacuum Shelf Dryer with Surface Condenser and High Vacuum Pump**

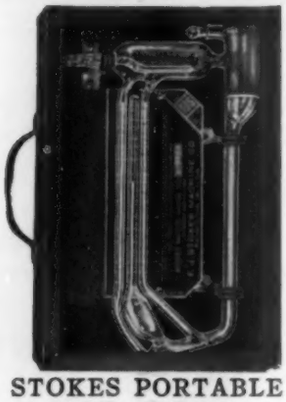




Above: **Laboratory Size Atmospheric Drum Dryer, stainless steel drum**

Fractional Distilling Apparatus specially designed so that all engineering data can be obtained—as installed at several universities





STOKES PORTABLE (McLeod Type) VACUUM GAUGE

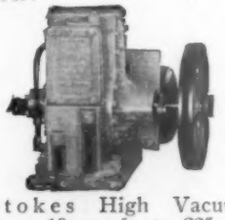
This is an improved lightweight, wide-range gauge with which accurate readings can be taken quickly and continuously. It takes two to five seconds only for a single reading and successive readings require not more than ten seconds each. Gauge is safely portable, reads from 0 to 5000 microns (5 mm.), is ruggedly built, measures only 7″ x 11″ x 2″ and weighs 4½ lbs. with mercury. Write for Bulletin 902.

We have had the privilege of working with the directors of the Frick Laboratory at Princeton, the chemical engineering laboratories at the Universities of Columbia, Pennsylvania, Tulane, Florida, Penn State College, University of Shanghai and others, both here and abroad. We have engineered and manufactured equipment in great variety and large volume, for both laboratory and commercial services, for more than 40 years.

This broad experience enables our engineers to cooperate with you in a most practical way in designing and building the type of apparatus you require, apparatus so designed that data may be obtained for the demonstration of basic principles in teaching or research activities.

Consult with us about equipment needed to develop or expand your facilities . . . Vacuum Dryers, Vacuum Evaporators, Distilling or other special apparatus and for standard Water Stills, Dryers, High Vacuum Pumps, etc. We know how to build equipment **economically** to best meet special requirements . . . will make specific suggestions and recommendations, if you will state your problems. Write for Chemical Catalog No. 40.

Stokes Water Stills are made in 22 stock models, capacities ½ to 100 gals. per hour. Widely used for the economical production of distilled water of exceptionally high chemical and bacteriological purity. More than 18,000 in use. Ask for Bulletin 907.



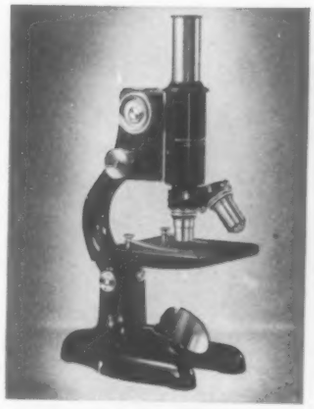
Stokes High Vacuum Pumps, 10 cu. ft. to 225 cu. ft. displacement. Produce and maintain vacuum within a few microns of absolute. Three moving parts only. Oil-sealed, rotary type. Built-in oil clarifier. Other features. Catalog 38-P.

BAUSCH & LOMB OPTICAL COMPANY

655 St. Paul Street, Rochester, N. Y.

New York Chicago Boston Los Angeles San Francisco
London, England Frankfurt A/M, Germany

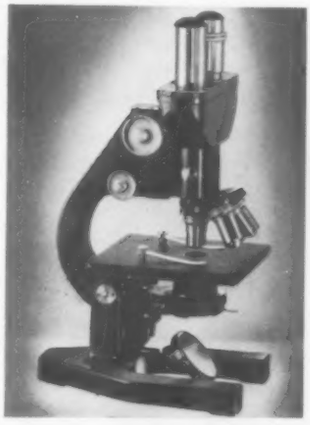
FB MICROSCOPE



Microscope FB is especially designed and built for elementary science work and its price, based on quantity production, is in line with the most restricted budget. It is ruggedly built to stand many years of hard class room usage. Its optics are of the same precision type that characterize the more expensive research type of instrument. Features include standard size, coarse and fine adjustments, double revolving nose piece, standard objectives and eyepieces, disc diaphragm, solid Bakelite stage, concave mirror, etc. Velvety black, wear resisting finish—Chromium plated parts.

Microscope F is similar to the instrument above but fine adjustment has been eliminated in the interests of economy. Magnifications range from 20 to 310 diameters.

HRE-8 MICROSCOPE



This splendidly designed and sturdily built microscope is especially adapted for advanced work in universities. Has vertical binocular body tube (interchangeable with monocular tube for photomicrography). The large stage (115 mm x 130 mm) is plain although any type of stage can readily be attached. The Abbe type condenser, 1.20 N.A., is in rack and pinion sub-stage. Huygenian type eyepieces and Achromatic objectives are of the finest grade optically. Oil immersion objective included. Other eyepieces and objectives for various purposes are available. Inclined binocular body tube is recommended for greatest comfort in extended observations.

K TYPE BINOCULAR MICROSCOPE

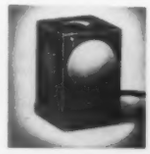
The great popularity of the K Type Binocular Microscope has prompted us to offer the Model "K," for schools and universities. Its range of magnifications of from 7X to 150X especially suit it for biological, bacteriological and paleontological work. An interesting feature of this series is the new dustproof Shuttle nosepiece, specially made for this series. This microscope gives stereoscopic, three dimensional effect. Image is upright and unreversed. Exceptionally wide field.

MICROSCOPE TABLE LAMP

This Table Lamp can be used to illuminate several microscopes at once. It is invaluable in class room work where groups of students are making observations at the same time.

Equipped with daylight blue globe, this lamp represents the finest source of artificial daylight for the microscope, approximating noon sun light.

OTHER MICROSCOPE LAMPS



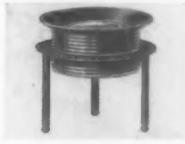
Other B & L Microscope Lamps are available for various purposes in the school laboratory. The two shown herewith are (right) a substage lamp and (left) the Universal Microscope Lamp.

B & L MICROTOMES

The B & L line of Microtomes is most complete. The Minot Automatic Rotary Microtome illustrated is ideal for rapid serial sectioning, cutting section with accuracy down to 1 micron in thickness. Feeding mechanism operates automatically. Dustproof operating mechanism. Catalog D-21 describes the complete line, including the new Precision Automatic Microtome—motor driven.

B & L SPECTROGRAPHS

The complete B & L line of Spectrographic Equipment covers every need. Models range from the Bunsen Spectroscope for elementary class room work to the large Littrow Spectrograph for examining complex alloys. Each is designed and built with the utmost care and due to our great experience in this field represents all of the best features necessary for both teaching and laboratory research. Catalogs D-221 and D-20 give complete details.



QR MAGNIFIER

This is an adjustable tripod type magnifier which is placed directly over the specimen. Has double lens, magnifying 7.5X. Useful for the school laboratory. Other magnifiers for various purposes are available.

SEND FOR CATALOGS

For complete information on Laboratory Microscopes send for Catalog D-185. For information on B & L Balopticons see page 345 this catalog. Remember the instrument listed on these pages are but a small part of the B & L Line. If you have need for information on any optical products whatsoever, Bausch & Lomb will gladly be of service to you.

SPENCER LENS COMPANY

Buffalo, New York

Manufacturers of

Microscopes—Microtomes—Optical Measuring Instruments
Delineascopes—Photomicrographic Cameras

BRANCH OFFICES

New York . . Chicago . . Washington . . Boston . . San Francisco . . Los Angeles . . Dallas . . Columbus . . St. Louis . . Philadelphia

STUDENT MICROSCOPE No. 74

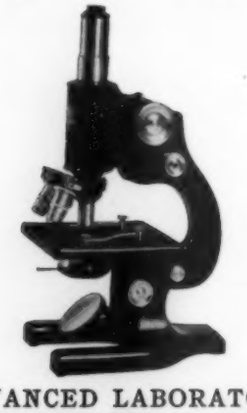
A low cost, standard size, quality instrument for classroom work requiring magnifications up to 360 diameters. Equipped with coarse adjustment only. Solid bakelite stage, 110 mm. x 105 mm., will not warp and is resistant to all ordinary laboratory reagents. Revolving disc diaphragm is easily rotated at edge of stage. Concave, adjustable mirror of standard diameter, is mounted in an adjustable fork. Substage condenser cannot be supplied with this instrument.

ELEMENTARY LABORATORY MICROSCOPE No. 66

This standard size microscope for biological laboratory work has the same high quality optics and mechanical parts found on the more expensive instruments. Equipped with coarse and fine adjustment. Substage condenser cannot be supplied with this instrument. Durable, bakelite stage 110 mm. x 105 mm. Sturdy, revolving disc type diaphragm under the stage is easily manipulated at edge of stage.

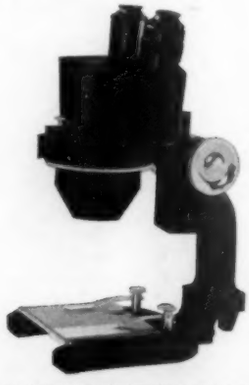
ROUTINE LABORATORY MICROSCOPE No. 63

This microscope meets the most rigid specifications for a sturdy, durable and precision laboratory instrument. Designed to accommodate a substage condenser for greater magnifications. Highest quality optical system. Has both coarse and fine adjustment. Durable bakelite stage 125 mm. square. An iris diaphragm, located under the stage, insures satisfactory modification of illumination for low power work.



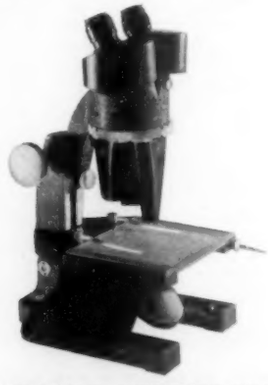
ADVANCED LABORATORY MICROSCOPE No. 33H

Designed for almost any type of microscopic observation because it permits the use of all standard Spencer microscope accessories. Has the following exclusive Spencer optical and mechanical features: (1) Balanced Optical System, (2) Dual-Cone Nosepiece, (3) Fork-Type rack and pinion Substage, (4) Rhodium Plated Parts. Has micrometer type fine adjustment. It is the microscope generally selected for medical work. Mechanical stage on No. 33MH has a range sufficient to cover 3″ x 2″ microscope slide.



JUNIOR STEREOSCOPIC MICROSCOPE No. 67

This instrument meets the demand for a low cost stereoscopic microscope for general classroom use. The vivid erected image aids inspection and analysis of the object. The paired objectives are of the same optical quality as those used on higher priced instruments and may be furnished in a special, dustproof revolving nosepiece. Supplied at slightly higher cost with base, mirror and inclination joint.



STANDARD STEREOSCOPIC MICROSCOPE No. 25

Notable improvements, the result of long cooperative experience with users of this type of equipment, distinguish the present Spencer Stereoscopic Microscope. Satisfactory stereoscopic vision depends upon depth of focus as well as angle and Spencer scientists have found a practical balance that provides depth as well as brilliant resolution. A large object field and resolution of fine detail are equally important features. A wide range of magnification, from 6.3X to 144X, is available.

THERE IS A SPENCER MICROSCOPE FOR EVERY PURPOSE. WRITE DEPT. B13 FOR COMPLETE DETAILS

GENERAL ELECTRIC COMPANY

General Office: Schenectady, New York

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ELECTRIC LABORATORY APPARATUS AND EDUCATIONAL SERVICE for COLLEGES AND TECHNICAL SCHOOLS

Motors
Generators
Switchboards
Converters

Control Panels
Relay Demonstration Panels
Transformers
Electrical Measuring Instruments

Recognizing the fact that the future welfare of industry, and of this country, depends upon how well the students of today are trained for the work of tomorrow, the General Electric Company endeavors to aid the faculty and students of our schools and colleges in every way possible. To this end, publications, technical information, motion-picture films, illustrated lectures, etc., are made generally available without charge. Further than this, liberal discounts are allowed to educational institutions.

For use in school laboratories the General Electric Company has given special attention to the design and manufacture of various instruments, machines and devices that embody the characteristics of the corresponding commercial types, but in smaller sizes and ratings, at less expense.

General Electric engineers will be glad to recommend apparatus to meet your special conditions if you will give them details such as the type of course, number of students, laboratory or shop space available, etc.

ELECTRIC MEASURING INSTRUMENTS

No apparatus in the college laboratory is of more importance than the electric measuring instruments. A well-equipped laboratory will need an assortment of standard instruments of all types and capacities, since there is hardly an experiment performed by the students which does not require their use.

The satisfaction and benefit derived from these laboratory experiments depend to a very large degree upon the **accuracy** of the instruments. There is nothing more discouraging to the student than to find that his results do not check. For this reason, when selecting laboratory instruments, too much care cannot be given to accuracy, permanence of calibration, dead-beat indications, and legibility of scales. Of course, local disturbances should not influence readings and, in many cases, low internal losses are important. If, added to these features, instruments of structural simplicity and fine appearance can be procured, one important problem facing the laboratory director will have been solved.

In the design and construction of G-E electric measuring instruments, careful consideration is given to all these details. The instruments described on the following pages have been selected from a wide range of the Company's products as being most suited to school laboratory use.

General Electric, aware that electric laboratory instruments are subjected to extremely rough usage in the hands of inexperienced students, offers a prompt and complete repair and recalibration service to college and technical schools at cost.

PORTABLE INSTRUMENTS

Type P-3
Alternating Current

Type P-3 instruments are designed and built to give long, dependable service at high accuracy. They comprise a full line of ammeters, voltmeters, single-phase and polyphase wattmeters, frequency meters, power-factor meters, and a single-phase wattmeter for low-power-factor measurements—each of the above covering the usual ranges of current, voltage, frequency, etc. The instruments excel in mechanical construction, are neat in appearance, and very substantial. They are enclosed in neat walnut carrying cases, approximately 5½ by 8½ by 8¼ inches, with removable hinged covers, snap locks and leather handles.

Accuracy: The P-3 instruments, with the exception of polyphase wattmeters, are correct to within 0.2 per cent of full-scale values on direct currents, and on alternating currents of any frequency up to 133 cycles per second, if the scale corrections are applied. The accuracy variation of the polyphase wattmeter is 0.5 per cent.

VARIATION PER DEGREE C. AMBIENT RISE

Wattmeters	Per cent
50/100 volts	0.01
100/200 volts	0.01
200/400 volts	0.01
Ammeters	
5/10 amperes	0.02
Voltmeters	
75/100 volts	0.01
150/300 volts	0.01
300/600 volts	0.02

Scales: Scales subtend an arc of approximately 90 degrees and are approximately 6½ inches long. They are very legible. Attached to inside of cover of each instrument case is a calibration certificate.

PORTABLE INSTRUMENTS—cont.

Type DP-2
Direct Current

Type DP-2 instruments comprise a complete line of high-grade direct-current instruments obtainable in the same classifications as the alternating type, as mentioned on the preceding page. All DP-2 instruments utilize the well-known d'Arsonval element. They are built complete in a polished walnut case with hinged cover, snap catch and leather handle, 8 by 8 by 4½ inches overall.

High Accuracy

Type AP-9 Voltmeter

Types AP-9 and DP-9
Medium Size
For Alternating and Direct Current

Types AP-9 and DP-9 instruments are of medium size, for general laboratory and testing work. They are available as ammeters, voltmeters and single-phase wattmeters in a wide range of ratings. The case is of attractive, durable molded Textolite, and the long scale (4.1") is equipped with a mirror which, in conjunction with the knife-edge pointer, practically eliminates errors due to parallax. The accuracies of the Types AP-9 and the DP-9 are within ¾ of 1 per cent, and ½ of 1 per cent of full scale value, respectively. An external zero adjuster is provided on the outside of the case. **For further information, ask for GEA-1784.**

Combination volt-wattmeters are also available. One is rated 150 volts, 500 watts, and has a convenient plug and socket connector to adapt it for testing home appliances. Other ratings are also available.

Types AS-5 and DS-5

Types AS-5 and DS-5 are also well adapted for work in freshman or sophomore laboratories or shops of vocational or technical high schools. The molded-compound case is $5^{15}/_{32}$ by $3^{7}/_{16}$ by $1^{31}/_{32}$ inches. The scale length is approximately 3 inches, and the accuracy is within 1 per cent of full-scale value. All instruments are equipped with zero-adjusting devices with readily accessible operating screw projecting through the case.

Both the AS-5 and the DS-5 types are made with the multiple rating, or double scale, and with but one pair of terminals. The transfer from one scale to the other is accomplished by means of a cylindrical switch located between the two binding posts. **Type DS-6** instruments are also available, constructed with a d'Arsonval movement and a copper-oxide rectifier for use on both alternating and direct current. **For complete details, ask for GEA-1784.**

Type AS-5 Voltmeter

Portable Stand for 3½-Inch Instruments

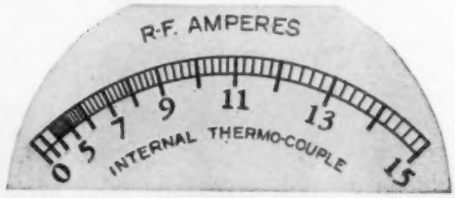
SMALL PANEL INSTRUMENTS

Alternating and Direct Current

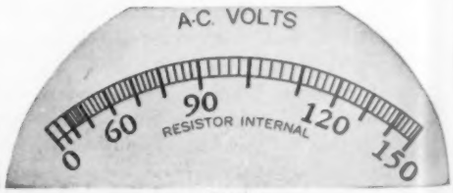
This line of instruments includes voltmeters, ammeters, milliammeters and microammeters **(Types AO and DO).** Accuracy is within 2 per cent of full-scale value. Cases are of durable molded Textolite. Applications include welding sets, battery-charging panels, radio test sets, etc. Type AO-21 or DO-40 is supplied with a universal-type case, for flush or surface-mounting. Type AO-22 or DO-41 has a wide flange for flush mounting; diameter over flange, 3½ inches. **Ask for GEA-1239.**

TYPICAL SMALL PANEL INSTRUMENT SCALES

60 Divisions



75 Divisions



40 Divisions

SWITCHBOARD INSTRUMENTS

Rectangular Type
For Alternating and Direct Current

G-E rectangular-type switchboard instruments include voltmeters, ammeters, wattmeters, power-factor meters, and frequency meters, for alternating current **(Type AD-6)**; and voltmeters and ammeters for direct current **(Type DD-6)**. These instruments are of the highest quality; the accuracy of the voltmeters, ammeters and wattmeters is within 1 per cent of full scale.

Other features include: dull-black finish metal case, antiparallax scale and pointer, antiglare glass; long, clearly marked scales (5.1"); magnetic damping, high torque, and attractive appearance. **For complete description, ask for GEA-1758.**

Rectangular

Photoelectric Recorder

PHOTOELECTRIC RECORDERS

The photoelectric recorder possesses all of the desirable characteristics of direct-acting recorders, and at the same time is capable of a sensitivity and a rapidity of response equal to the highest-sensitivity indicating instruments. In general, anything which can be indicated can be continuously recorded by means of the photoelectric recorder.

The usefulness of this instrument has been clearly demonstrated; the results in many cases being of such a nature that they could not have been obtained by any other known method.

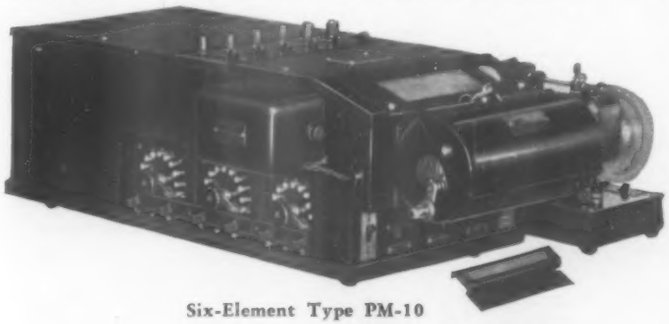
The instrument is completely self-contained, requiring only an auxiliary source of 115 volts, 25, 50, or 60 cycles, depending upon the frequency desired. It is available for either portable or switchboard use.

The internal parts of the photoelectric recorder may be grouped into five units; namely, the basic indicating instrument or galvanometer, optical system, recording element, chart carriage, and power unit. For complete description ask for GEA-2394.

PERMANENT MAGNET OSCILLOGRAPHS

The six-element, general-purpose oscillograph, Type PM-10, is designed for convenience in operation under all test conditions. It is furnished with six galvanometers for current or potential measurements, and a timing vibrator provides a seventh record when it is desired. Watt galvanometers, interchangeable with potential galvanometers, are available.

This oscillograph is suitable for use in the laboratory or in the field. It produces records 3⅝" or 6" wide, either in a magazine film holder giving 3 or 5 exposures on a roll film, or in continuous-drive film holder giving continuous records up to 20 feet in length. A continuous-drive record paper holder is available, which gives records up to 100 feet in length.



Six-Element Type PM-10

The Portable two-element oscillograph, Type PM-12, is entirely self-contained. This instrument meets the needs of schools and colleges where it is desired to show two simultaneous records (current and voltage) on a viewing screen. A rheostat is available which may be connected in series with the current element, thus providing for two voltage records. It also provides means of making inexpensive oscillograms of recurrent phenomena.

A magazine film holder is included with this instrument. A continous-drive film holder for use in recording transient phenomena can also be furnished.

Two-Element Portable

POTENTIOMETERS

Extreme accuracy in the measurement of small potentials is obtained by using a **precision potentiometer.** This is accomplished without drawing any current from the source to be measured. This potentiometer will measure voltages down to one microvolt.

The **thermocouple potentiometer** is used to measure the **emf** of thermocouples. This does not draw any current from the thermocouples and therefore is the most accurate means of measuring a thermocouple output.

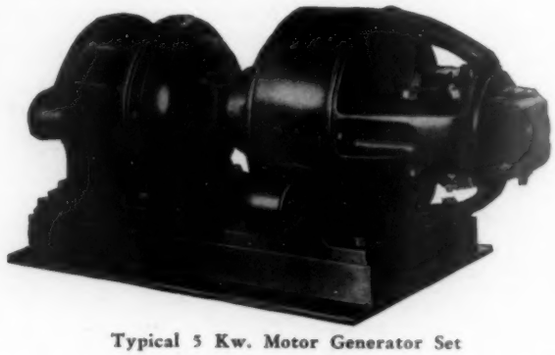
Precision Potentiometer

ELECTRON TUBES

The importance of electron tubes nowadays needs hardly be mentioned to the technical educator. It may be said that electron tubes are revolutionizing the electrical industry. All types of electron tubes are available.

ALTERNATING-CURRENT GENERATOR AND MOTOR

AHI Synchronous Generator, 6 Pole — 5 Kva (4 Kw., 8 Pf.) — 110/220 V., 1, 3 or 6 Phase— 1200 R.p.m.



Typical 5 Kw. Motor Generator Set

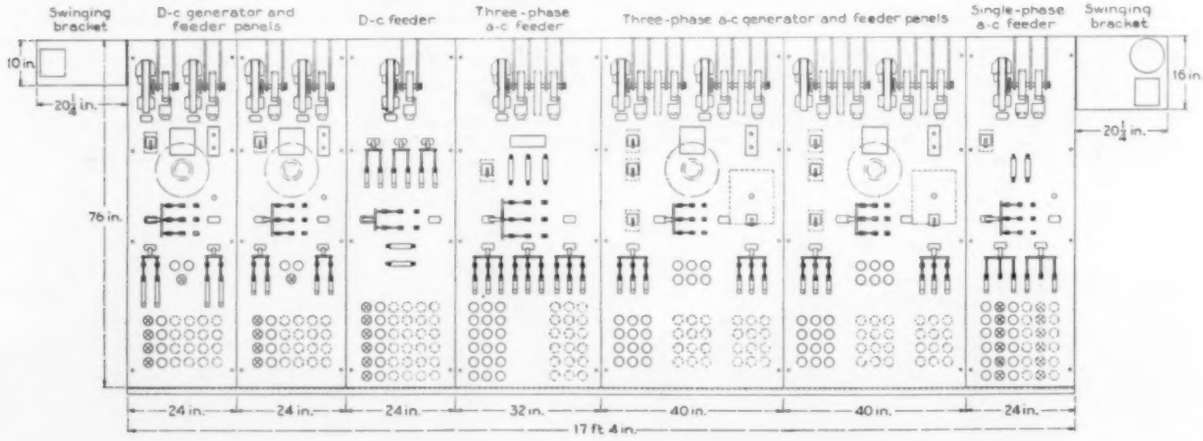
Type AHI alternating-current generator, illustrated, has long been the standard for teaching the fundamentals of alternating currents. Its flexibility permits its use in a very wide variety of laboratory experiments. It is now manufactured in two ratings which conform closely to standard commercial machines, but modifications make it ideal as a school demonstrating unit.

Type AHI is designed to run as an alternator or synchronous motor. Extra rotors are available which, when substituted in place of the salient pole rotor, convert the machine into a squirrel-cage induction motor, a phase-wound-rotor induction motor or frequency converter.

A phase displacement set and a phase displacement dynamometer set have been developed around the rating illustrated. These two unit sets are designed specially for laboratory use.

LABORATORY SWITCHBOARD

General Electric has developed a switchboard to meet the needs of the technical school laboratory which provides maximum flexibility. This board provides for parallel operation of a-c and d-c generators, under standard conditions, and it supplies the laboratory with a very effective and variable feeder system. A great asset to this feeder system is the plug switch also here illustrated, used extensively throughout the board. This facilitates making and changing connections and saves times and trouble in shifting power to circuits where needed.



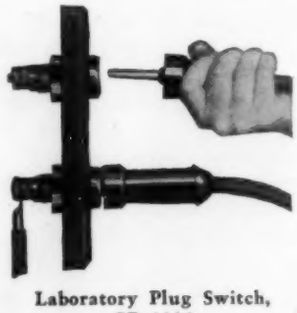
The holes shown dotted are for CR 1939 receptacles to be purchased separately, mounted by the purchaser, and connected to the auxiliary plug-switch panels. Holes not placed in service may be buttoned

Bulletin GEA-1185, illustrating and describing G-E apparatus particularly adapted to school and college laboratory use, is available on request. Also booklets on construction projects as follows:

GES-909: Construction Data, ¼-hp. Single-phase Induction Motor
GEA-2138: Construction Data, ¾-hp. Three-phase Induction Motor
GEA-2140: Construction Data, ½-hp. Single-phase Induction Motor
GEA-2289: Construction Data, 250-watt 125-volt d-c Generator
GET-569: Construction Data, Transformer Rated Natural Draft, 60-cycles, 1½-kv-a; Primary Volts, 220; Secondary Volts 55/110

Kits for these projects can be purchased from the General Electric Company.

Complete information can be obtained from our nearest sales office.



Laboratory Plug Switch, CR-1939

RAWSON ELECTRICAL INSTRUMENT CO.

INCORPORATED

101 Potter Street, Cambridge, Mass.

BRANCHES

New York City and Chicago

Specialists in High Sensitivity Meters — ***Special Apparatus Built to Order***

Types 501, 502, 504 and 520

TYPE 501 MICROAMMETERS, MILLIAMMETERS, MILLIVOLTMETERS, and VOLTMETERS

Single Ranges—
From 2 microamperes to 1 ampere, full scale.
From 1 millivolt to 1000 volts, full scale.

Multi-ranges—
From 4 microamperes to 1 ampere, full scale.
From 2 millivolts to 1000 volts, full scale.

Multimeters—14 Ranges—
1 microampere to 1 ampere. 20 microvolts to 1000 volts.

TYPE 502 THERMAL A.C. MILLIAMMETERS and VOLTMETERS

Can be used on A.C. or D.C.

Single Ranges—
From 1 milliampere to 1 ampere, full scale.
From 0.25 volt to 1500 volts, full scale.

Multi-ranges—
From 2 milliamperes to 1 ampere, full scale.
From 0.3 volts to 1500 volts, full scale.

Multimeters—14 Ranges—
From 2 milliamperes to 5 amperes.
From 60 millivolts to 1500 volts.

TYPE 515 THERMOCOUPLES

In Vacuo—From 2 milliamperes to 1 ampere.
In Air—From 0.5 amperes to 10 amperes.
Specials—For use on short wave frequencies.

TYPE 504 FLUXMETERS

For measurement of magnetic flux in maxwells or gausses, with electrical zero return. These are strictly portable and need no leveling.

TYPE 505 SWITCHBOARD PATTERN METERS and TYPE 507 SMALL METERS

Type 505

Type 507

Same ranges as Type 501. These cannot be supplied with internally mounted thermocouples.

TYPE 520 WATTMETERS—From 0.1 watt full scale up. Especially suitable for use on circuits having low power factors.

TYPE 520 DYNAMOMETER MILLIAMMETER and VOLTMETERS—From 10 milliamperes and 0.5 volt up; full scale.

OHMMETERS, TYPE 701—With self-contained battery and magnetic shunt to compensate for battery ageing. Suitable for measuring low coil resistances up to insulation resistance in megohms.

TYPE 704—Cross coil, independent of ± 20% battery ageing. From 1 ohm to 1000 megohms.

TYPE 508 ELECTROSTATIC VOLTMETERS

No power consumption on D.C. and very little on A.C. Full scale ranges from 120 to 3000 volts and up to 40,000 volts by the use of condenser multipliers. Measures true R.M.S. values. Special high ranges built on request.

Type 508

TYPE 503 SEMI-SUSPENDED MICROAMMETERS, MILLIAMMETERS and MILLIVOLTMETERS

The most sensitive portable meters manufactured. Although movement is carried on a suspension, the meter needs no leveling. Full scale ranges from 0.5 microampere and 0.1 millivolt up. Also supplied in multiranges.

503

Type 5053 — Similar to Type 505 but with semi-suspension element. Ranges from 0.75 microampere and 0.24 millivolt up.

Type 5073 — Similar to Type 507 but with semi-suspension element. Supplied in same ranges as Type 503. Price approximately 30% less than Type 503.

NEW DEVELOPMENT RAWSON TWIN MULTIMETER

Occupies less space than any other near equivalent meter. Covers all ranges of types 501 D.C. multimeter and 502 A.C. multimeter—29 in all.

Type 5012
Size 12" x 8" x 6"

WESTON ELECTRICAL INSTRUMENT CORP.

601 Frelinghuysen Avenue, Newark, N. J.

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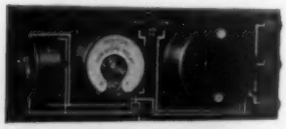
WESTON INSTRUMENTS

Standard for Instruction, Research, Industry

The use of WESTON instruments in educational work and scientific laboratories has become a fixed principle, for nothing short of WESTON accuracy and dependability are acceptable for engineering training. WESTON instruments are made to most exacting standards of craftsmanship and accuracy. They inspire students to be exact in experiments. And in using WESTONS in training, the student is familiarizing himself with the instruments he will use throughout his engineering career, for student graduates since 1888 have "Westonized" the industrial world.

Following is a condensed listing of the WESTON instruments available; also are illustrated a few of the models widely used in educational work. Complete information on all models is available in booklet form, and will gladly be sent on request.

MODEL 622
Ultra-Sensitive Microammeters, Millivoltmeters
Double pivoted type instruments for measurement of minute currents. Ideal for laboratory work and circuits involving thermocouples, pyrometers, electron tubes, etc.



MODEL 607
*** Photronic Photoelectric Relay**
Ideal to demonstrate theory and operation of photoelectric cells and sensitive relays. Consists of a WESTON Photronic Cell, a WESTON Sensitive Relay and a Power Relay mounted on a common base and wired. No outside voltage, nor troublesome amplifier required.

MODEL 280
Miniature Precision D.C. Instruments
Convenient and practical for student use, combining miniature size and ruggedness. Size 4⅝ x 4⅜ x 1½ inches. Accuracy 1% . . . hand calibrated mirror scales and knife-edged pointers. Available in single and multi-range instruments.

PORTABLE INDICATING INSTRUMENTS
Ammeters, Voltmeters, Wattmeters, Galvanometers, Microammeters, Ohmmeters, Microfarad Meters

PANEL MOUNTING INSTRUMENTS
Ammeters, Voltmeters, Wattmeters, Galvanometers, Microammeters, Ohmmeters, Microfarad Meters

INSTRUMENT TRANSFORMERS
Portable and Switchboard—Potential and Current

RELAYS
Sensitive and Power Uses—Current and Voltage Types

AIRCRAFT INSTRUMENTS
Tachometers, Temperature Indicators, Radio Compass Indicators, Ammeters, Voltmeters, etc.

ELECTRIC TACHOMETERS
A.C. and D.C. Types—Remote Indicating

LABORATORY STANDARDS
Voltmeters, Ammeters, Wattmeters

SPECIALIZED TESTING EQUIPMENT
Power Analyzer, Photoelectric Potentiometer, Battery Testing Instruments

SERVICE EQUIPMENT
Tubecheckers, Analyzers, Oscillators, Ohmmeters, Vacuum Tube Voltmeters

PHOTOELECTRIC CELLS
"Photronic" Cells—Dry Disc Type

PHOTOELECTRIC CONTROL DEVICES
"Photronic" Cell Controls, Illumination Controls, Smoke Alarms, Industrial Controls

LIGHT MEASURING DEVICES
Illumination Meter, Foot Candle Meters, Sight Meter, Exposure Meters

TEMPERATURE INDICATING INSTRUMENTS
ELECTRICAL TYPE—Remote Indicating
BIMETALLIC DIAL TYPE—Laboratory, Industrial

INSTRUMENT ACCESSORIES AND PARTS
Shunts, Cables, Resistors, Switches, Binding Posts, Leads, Multipliers, Adapters, Radio Plugs, etc.

STANDARD CELLS

*** Photronic—A registered trademark designating the photoelectric cells and photoelectric devices manufactured exclusively by the Weston Electrical Instrument Corporation.**

MODEL 525
Projection Instruments
Ideal for lecture and demonstration work. Scale can be projected to any desired size . . . seen from any room position. Available in A.C. and D.C. scale . . . also with standard scales for all needs.

MODEL 430
Portable, Precision A.C. and D.C. Instruments
Universally used in schools and industry wherever rugged, portable instruments are required for general testing. Hand calibrated, mirror scales with knife-edged pointers.

MODEL 375
Student Galvanometer
Widely used in school laboratories where durability and low cost are requirements, rather than extreme sensitivity. Other models of medium and high sensitivity available.

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EDISON NICKEL-IRON-ALKALINE STORAGE BATTERIES FOR SCHOOL AND COLLEGE LABORATORY USE

EDISON Nickel-Iron-Alkaline Storage Batteries for school and college laboratories have two important advantages:

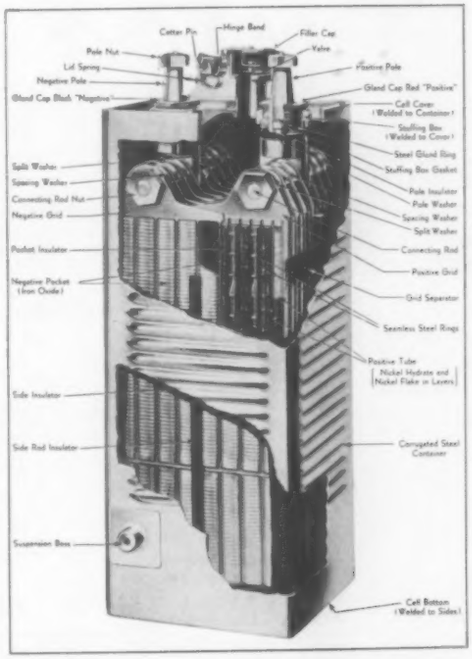
1. They are the most dependable and convenient source of d.c. for laboratory supply circuits.
2. They are the most extensively used type of storage battery in industry and hence the type with which the student is most likely to be concerned following graduation.

For D.C. Laboratory Supply Circuits

The Edison Nickel-Iron-Alkaline Storage Battery as a source of d.c. for laboratory supply circuits affords a dependability no other type of battery can approach. Use of steel for all structural parts combined with an alkaline electrolyte (which is a recognized preservative of steel) makes it practically indestructible and permits secure retention of all active materials within the plates.

Its charge and discharge results in the simple transfer of oxygen from one plate to the other. The fact that neither oxidation nor reduction, once completed, can be followed by further or other reactions, helps explain why it cannot be injured by overcharge, overdischarge, charge in reverse or other so-called electrical accidents.

These are some of the reasons for its great dependability, as well as its long life (2 to 5 times that of other batteries). Despite its higher first cost, it is the most economical battery to use.



Because of its all-steel cell construction the Edison Nickel-Iron-Alkaline Battery is the most durable made

A feature of especial value in school and college work is its ability to stand discharged during all vacation periods without need of attention and without suffering injury or deterioration of any kind.

Another feature is the convenience of using any number of cells in a battery assembly to vary the voltage as desired. This may result in unequal discharge and subsequently in overcharge of some cells when the assembly as a whole is recharged. Unlike other batteries, however, the Edison Nickel - Iron - Alkaline Battery is not injured by such treatment.

As a Means of Training in Industrial Battery Applications

Practically every major industry in the United States uses battery industrial trucks for plant transportation and material handling.

Subways and other electrified railways use storage batteries for control purposes on locomotives and multiple unit cars. Mine locomotives, miner's electric cap lamps, ship's electric power stand-by, steam railway passenger car lighting and air conditioning are other important industrial storage battery applications. In all such services, Edison Nickel-Iron-Alkaline Storage Batteries are the type in most extensive use.

Instruction in their care, operation and construction is thus of very practical value to the student.

Typical stationary laboratory battery; consists of 100 A4H cells having a capacity of 150 ampere hours; through a switchboard the output of any number of cells is made available for experiments requiring variable direct current potentials

Typical portable laboratory battery; consists of 5 B2H cells having a capacity of 37.5 ampere hours; note special taps, supplied at no additional cost with this type of cell, which permit ready use of output of variable number of cells

THE ELECTRIC STORAGE BATTERY COMPANY

World's Largest Manufacturers of Storage Batteries for Every Purpose

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FOR
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EMERGENCY LIGHT
AND POWER
See Page 143

Exide Batteries, the product of The Electric Storage Battery Company, are extensively used in the laboratories of the nation's foremost scientists, industrial research engineers, schools and colleges. Their performance records are the best testimony that can be offered as to their merit for laboratory services. The foremost characteristics of Exide Batteries are absolute dependability and sustained high voltage until end of discharge.

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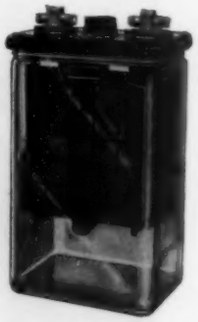

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Improved Design Simplifies Maintenance

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The structural details of Exide Batteries assembled in sealed glass jars have been so refined as to eliminate all maintenance attention other than recharging and an occasional addition of water, which, with automatic cell fillers, becomes a simple task.

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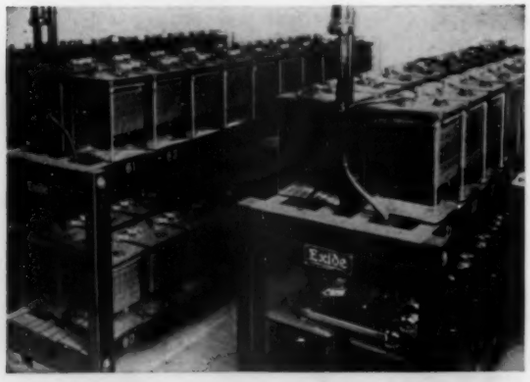
We are prepared and equipped to help you with any laboratory battery problem which may present itself. The wide experience of Exide engineers and the services of our nation-wide Exide organization are at your disposal. Write to the nearest Exide office shown above for further information.



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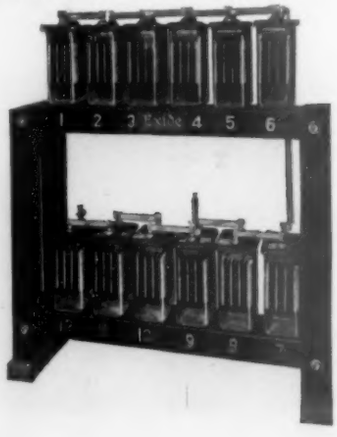

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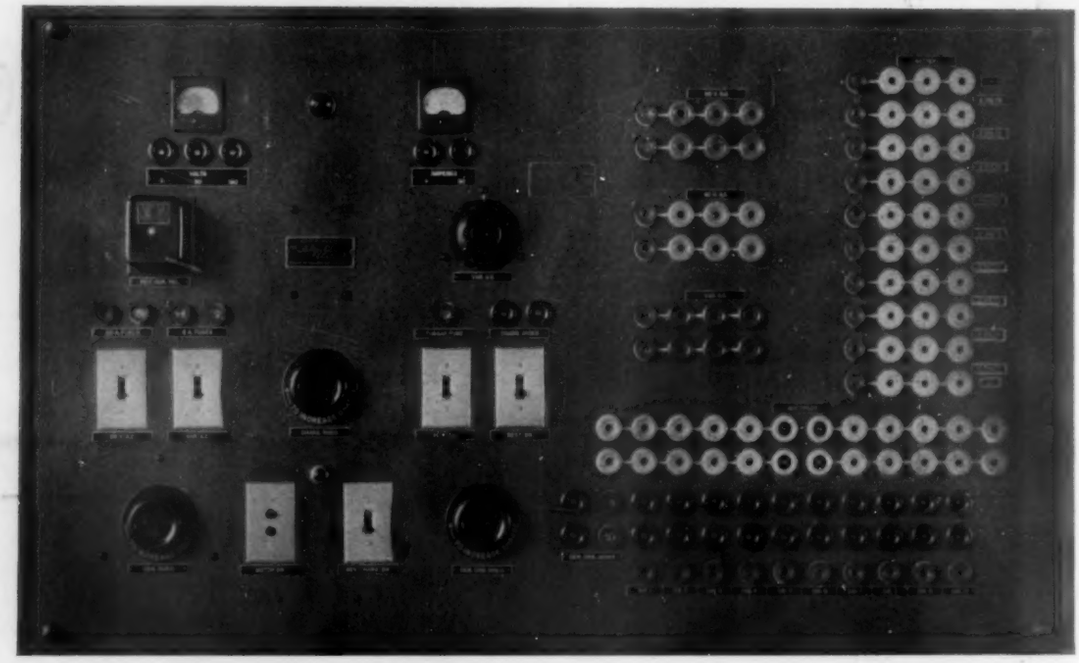

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SECTION XI
SHOP PLANNING AND EQUIPMENT

THE COMPLETE VOCATIONAL ADJUSTMENT SERVICE OF THE THOMAS A. EDISON VOCATIONAL SCHOOL IN SEATTLE

By SAMUEL E. FLEMING

Assistant Superintendent, Public Schools, Seattle, Wash.

THE Thomas A. Edison Vocational School, operated as part of the Seattle Public School System, is nine years old. Starting in 1930 with a program of seven trade courses, it has enjoyed a steady, substantial growth in numbers and in range of service.

Edison is more than a vocational school in the usual sense. It is a vocational adjustment service providing, besides job training, vocational guidance as an antecedent to training, and placement as an essential condition for the completion of its training job.

This service at the present time covers 35 different occupational fields. Within each field the program is varied. In some, as in the machinist trade, three types of courses are available—day trade, part-time apprentice, and evening trade extension. In other occupations two, or perhaps only one, type of opportunity is offered. The determining factor is always student need as checked against the demands of the occupation itself. In the spring of 1938, when the last completed summary was made, out of a total of 3,067 students who had enrolled, 281 were in day trade courses, 2,305 in evening trade extension, and 481 in part-time types of training.

In its inception certain principles were laid down as controls for the Edison program, and they have been validated by the test of experience. These principles, in our judgment, have made Edison, and have constituted its contribution to vocational education.

One Standard—Service in Its Field

In general, school administration loves order and schedules and standards and classifications, however much it may voice its protest to the contrary. It has a predisposition for doing tomorrow as it did today, but a vocational school cannot be confined within bounds set by precedent. It is dealing with a world of industry and business whose schedules are subject to change without notice.

Edison has only one standard—service to the occupational fields it enters and to the students who seek its help. A course offered today may be discontinued tomorrow. Length of training varies with the learning rate of individual pupils. The equipment today may need to be replaced tomorrow, whether the date for replacement purchases of equipment has arrived or not. Familiar school stereotypes have been discarded, not through any delight in image-smashing, but because they do not work.

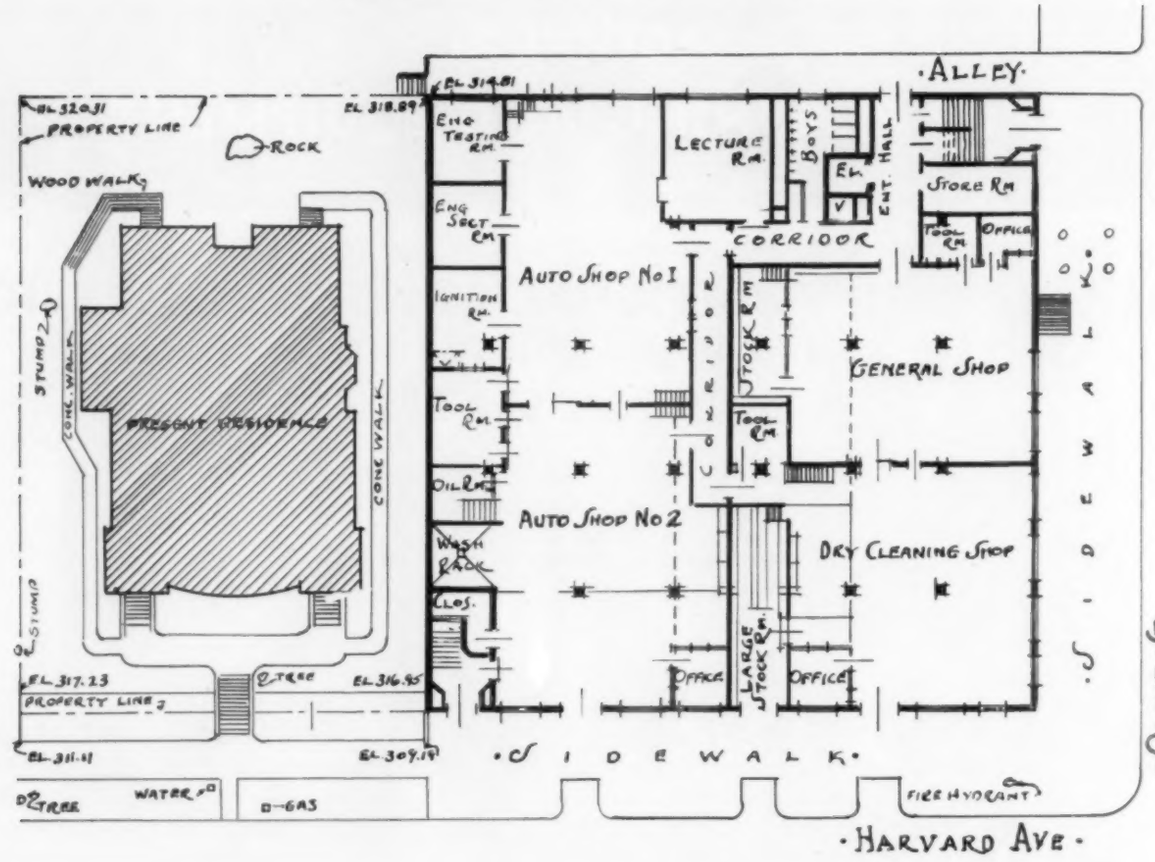
A Tailor-Made Program

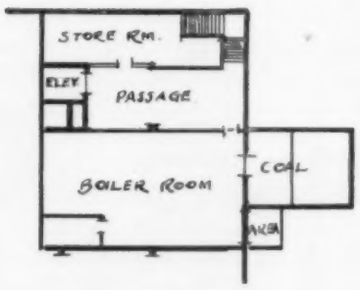
Frequently the question is asked: "What trades do you offer?" I can, of course, answer by naming the trades on our program, but I have to introduce the listing with the qualifying word "now." The Edison program is tailor-made to fit the measure of conditions in Seattle as we have been able to learn them. We are certain about its applicability to Seattle for the time being, but would make no prediction as far as any other community is concerned.

From the very beginning Edison courses have been initiated on the basis of a survey of conditions in the occupation under consideration. An answer is sought to three questions:

1. Is there a demand for skilled workers in this trade?
2. Is there an adequate training program at present?
3. Is a training program sponsored by the public schools practicable?

In its study of occupational fields Edison goes one step further than a survey, to make assurance doubly





Above—First-floor plan

Left—Basement plan

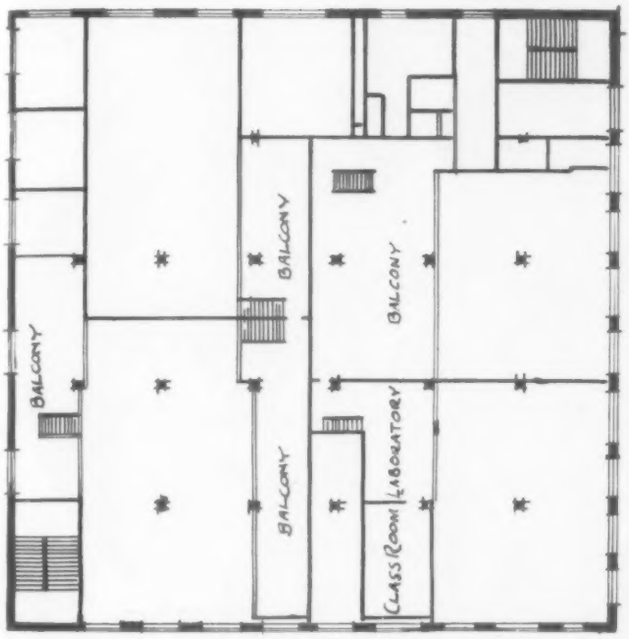
sure. Following a survey, it invites representatives of employers and labor to evaluate and interpret the survey. This procedure is slow, but it has many advantages over the trial and error procedure or the acceptance of the experience of other communities as valid locally.

The school is always eight or ten surveys ahead on its program. At least a dozen occupations are now approved for a training program and only await facilities for their operation. As a matter of fact, several industries, through both employer and labor, are now soliciting the school to assume a training program for them. Not long ago we had a request from a business agent, which is more or less typical of what is happening: "I am Jack Adams, business agent for the shoe repair union. My friend Joe Ames told me what you are doing for the foundrymen. Can't you do something for us?" Edison does not need to seek business today. Its facilities lag behind the voluntary calls for help from various fields of business and industry.

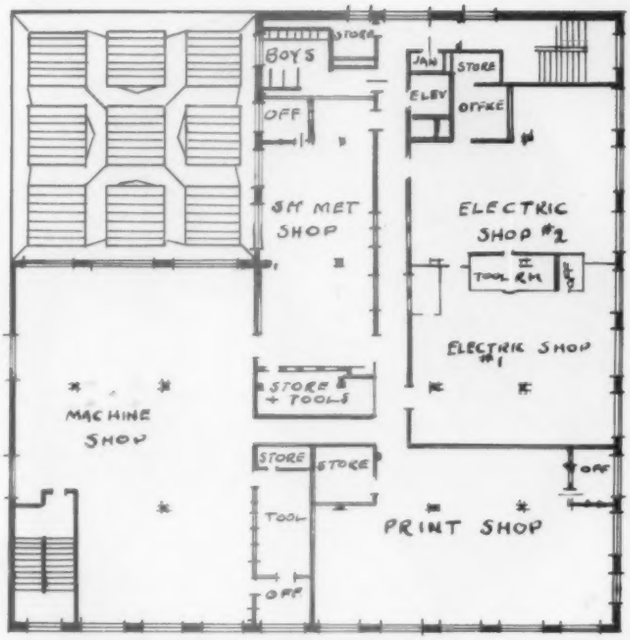
The Facilities of This Comprehensive, Cooperative Enterprise

No group or agency that might be concerned or that might have something to contribute has been neglected. The regular school personnel has been cultivated, and understanding Edison has been a decided factor in providing a satisfactory student personnel for the school. Intimate contact is maintained at all times with the State Board for Vocational Education and the Vocational Education Division of the United States Office of Education.

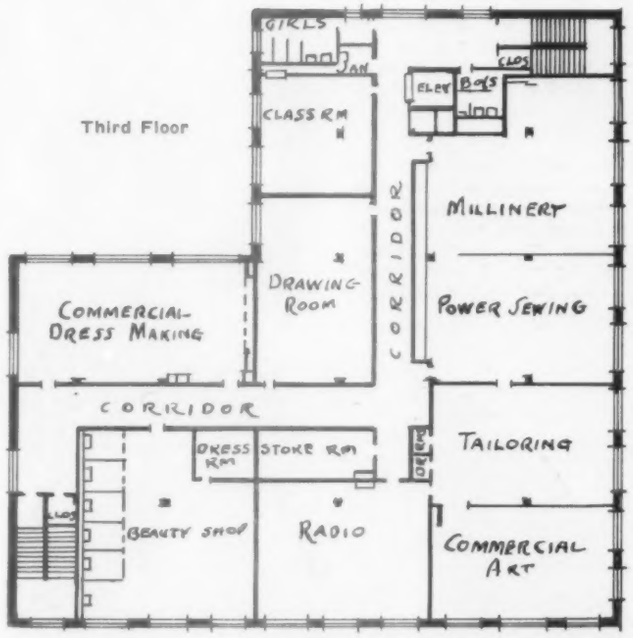
Of special significance in the cooperative set-up is the advisory committee organized in each trade from the ranks of workers and employers. This committee keeps the training program real. It recommends the teacher, advises on equipment needs, interprets the program to various groups, makes a way for placement of trained students. The advisory committee is the key to good-will and a close tie-up with the industry to which it belongs.



Balcony Plan



Second Floor



Continuous coordination is maintained between the school and the occupations it serves. This is done through the Coordinator for Trades and Industries, and the Coordinator for Business Occupations. In addition to the contacts which the coordinators effect, all teachers utilize a half-day every other week for field visits.

Student Personnel Is Selective

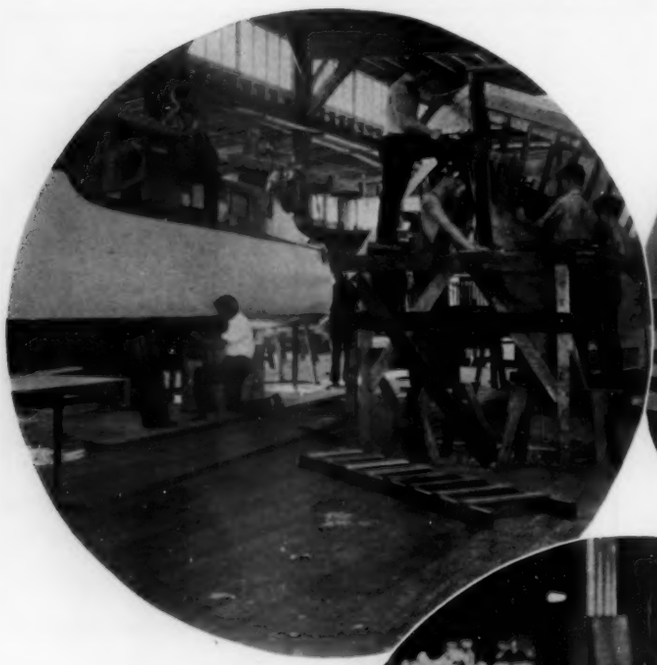
Students apply for membership in Edison. They submit their records as evidence of their qualifications. These are studied, and applicants are accepted or rejected for training on the joint appraisal of the teacher of the class and the principal of the school.

Sometimes the process is called "screening," but this implies the discarding of the portion rejected, while Edison's idea is the distribution of applicants into various opportunities according to their individual fitness. That is why the school hopes ultimately to offer training in sixty or more fields, because it would like to have some opportunity for every serious-intentioned normal person.

This process of selective enrolment is designed more as a protection to the individual student than as a protection for the school. Of course it is both. It is no kindness to permit a person to embark upon a course of training for an occupation which he hasn't the qualifications to follow after he is trained. Disillusionment is less disintegrating before than after an investment of time and money in a project that proves futile. However, if the school must make a decision after all efforts have failed to get the applicant to size up the situation himself, doubts are resolved in his favor. Frequently, when the student persists in his opinion, a three-months trial is approved.

Challenged at first by those who wanted to see the free and easy elective program of the high school extended to Edison, the selective enrolment procedure has been accepted as one of the most commendable policies of the school. Every trade has a waiting list of acceptable applicants.

Edison has avoided the fate that has meant death to many a vocational school: it is not the last resort

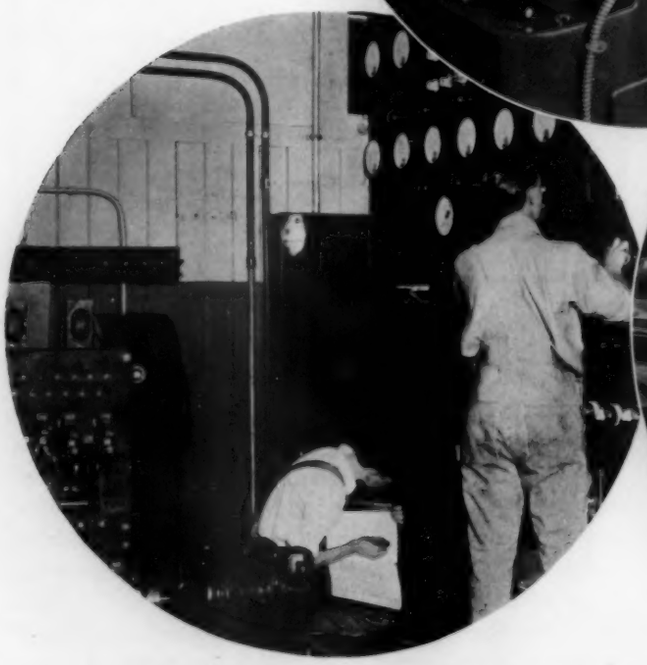


Above—Boat building is a local industry in need of skilled workers. Edison-trained boys are in demand in the Seattle area

Above—Radio servicing attracts high-school graduates with high standing in science and mathematics. This class is experimenting with television

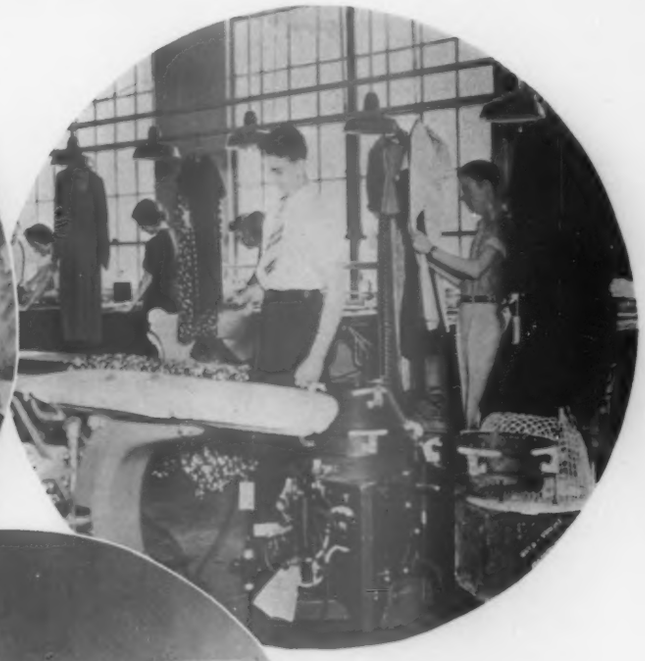
Below—Only boys with superior records in high-school mathematics and science are accepted for the electrical trades. The training qualifies for several branches of the electrical industry

Below—Edison has found that there is a demand for technically trained auto mechanics in spite of what appears to be a surplus of workers



Center—A future machinist at work on a milling machine production job supplied by cooperating industry

Above—Welding as an industrial process is replacing riveting. Edison is re-training many riveters in this new skill. Both acetylene and arc welding are offered



Above—Cleaning, spot removing and pressing affords a splendid opportunity for both boys and girls. Placements are made over the entire Pacific Northwest

Below—Edison offers training in salesmanship and store service. Merchants have cooperated heartily with the program

Below—High-school graduates have found a profitable occupation through the Edison beauty-parlor course. Girls are in school 48 hours a week, working much of the time on customers

Center—Placement in the tailoring trades has been so satisfactory that the tailoring class has become very popular

of the student who has failed to meet the academic requirements of the high school. The fact that a student has not met academic standards means nothing to Edison unless those standards are essential for the pursuit of the occupation for which the high-school misfit applies. For example, a boy who has a poor record in mathematics and science would be a poor prospect for the electrical course, although he might measure up to the prerequisites for the dry-cleaning trade. Each applicant's credentials are judged in the light of his fitness for the occupations for which he is being considered.

High-school graduation is not a condition for membership in the school excepting in the business training department. However, a very high percentage of the student body in the trade department is on the high-school post-graduate level. This is as might be expected, because there are few trades in which the general educational background represented by a high-school diploma is not an advantage. Then, too, Edison shows preference to the high-school graduate because the regular high school has nothing to offer him, as it has the student who has not graduated.

The school has no upper age limit. Some of the best service it renders is to older men and women who are confronted with a need for re-training. The social agencies use its facilities freely in assisting women, particularly, to prepare themselves for a wage-earning occupation after an emergency has come into their lives demanding a prompt adjustment to a new economic status.

Training Program Approximates Working Conditions

The training experience of Edison students is as close as possible to the conditions that will confront them when they go to work. Teachers are selected from the crafts. Equipment is up to date. A seven-hour day prepares students for the sustained effort demanded on the job. All practice is on customer work.

Production is held to be a prime necessity for a real training job. In order, however, to avoid unfair competition with private industry, it is understood that the school will limit its production to the volume essential for training purposes. No difficulty has been experienced in getting employers and workers to accept the school's production program as a prerequisite for training.

Edison Completes the Job

Edison sets out to do a complete job for its students. In the first place, it gives them guidance in the selection of a training program. In the second place, it provides a realistic training experience geared to the demands of the job. In the third place, it does not call its services complete until the trained student is placed on the job and is making satisfactory progress. So important is the actual performance on the job rated, that students are not awarded diplomas until they can show six months of successful work experience.

Edison's placement record has been all but 100 per cent, even during the difficult years 1931-1934. There are several reasons for this good placement record. Placement is the final result toward which all effort is directed. Edison graduates are all but guaranteed employment if they will cooperate with the school. This is true because:

1. The number trained is limited to the number that can be absorbed in the trade. This cannot be done absolutely, but to all practical purposes.

The advisory committee assists in pointing out the opportunity for new workers in an industry. Coordination by the school through teachers and coordinators provides a continuous picture of employment conditions. Placements and follow-up records on placements indicate current conditions.

Instead of overtraining in any one industry, Edison believes in training for several industries. For example, 40 trainees in two industries have a better chance for employment than do the 40 in one industry, providing, of course, equal care is used in selecting the industries.

In passing, it might be pointed out that diversifying does not add to the cost of a vocational school. Only one class can be trained with one set of equipment if, as in Edison, pupils are given from five to seven hours per day in shop practice. It costs no more to provide a set of equipment in some additional field than it costs to duplicate equipment. For example, 20 students could be trained as machinists and 20 as tailors at no greater cost than to train 40 as machinists.

2. The selective character of the pupil personnel eliminates many factors that would render placement difficult.

3. The intimate contact with the industry maintained through teachers and advisory committees insures a ready entrée for Edison trainees.

4. An active placement service looks after the employment interests of the graduates.

5. Through their success, graduates have made the Edison trademark a stamp of superior quality.

Edison is continuously in the making. As conditions change, it will adjust itself to such changes. Courses will be added, discontinued or modified in accord with what appear to be the needs of industry, which are also the needs of workers. Its sole purpose will be to assist men and women, young and old, to find economic stability and satisfaction in their work.

PURCHASING EQUIPMENT FOR THE INDUSTRIAL ARTS DEPARTMENT

By THOMAS A. HIPPAKA

Professor and Head of Industrial Education, Iowa State College

THE first maxim in purchasing equipment is: Buy something good and then take care of it. Generally we get what we pay for. Even in the best industrial arts shops equipment gets hard use, and this is not always intentional on the part of students and teachers. Many pupils are in the initial stages of various learning processes, and the best of them will make mistakes. Good equipment can stand such punishment without unreasonable repair bills.

Pride in excellent equipment motivates good care and proper use of it. With such machines and hand tools, tasks can be completed in a workmanlike manner, and the best shop practices adhered to all the way. While it is not the general purpose of secondary schools to develop high-grade mechanics, students in industrial arts should be provided with opportunities to do jobs to the best of their ability and to develop proper work habits.

Up-to-Date Safe Equipment Essential

What constitutes suitable equipment for any shop? Certainly it should not as a general rule be machinery purchased at a fire sale or from some ancient industrial plant that is being dismantled to make way for a modern one. The idea that old, obsolete equipment is good enough for the schools is absolutely wrong. In this fast-moving world of ours the latest and the best becomes old soon enough. Often industrialists donate old machinery to schools, and school officials graciously accept it. School administrators and teachers have no right to do this. Our influence in our respective communities should be such that every shop is equipped with modern tools and machinery.

Safety is a most important factor in any shop. Unless the guards and other safety devices on a machine comply with the state safety code, they should not be purchased. Bids on equipment should be rejected on the same basis. Since instruction in safety is a vital part of every shop course, adequately guarded equipment must be secured in order that this instruction may be properly given to the pupils.

Then there is the matter of small machinery versus large machinery. Some feel that all our machinery should be of the bench type. Others argue that it should be entirely of the heavy pedestal floor type. Somewhere between these extremes is the proper set-up.

For the Junior High School Shop

Naturally, any machinery purchased for junior high school shops may well be of the lighter type. This would be true in the print shop, metal shop and automotive shop. It is probably the better general practice not to allow junior high school boys to use high-speed woodworking equipment or even high-speed grinders. Most of these boys are immature, and accidents are bound to occur, even under rigid inspection and supervision. There will be ample opportunity to gain experience on machines in the senior high school. Then, too, it is important that somewhere in the boy's school experience the major emphasis be placed upon the use of hand tools. The junior high school shop is a good place for such emphasis.

Lighter machinery, then, should be purchased for the strictly junior high school shop. This holds in the so-called unit shop where only one subject is taught, as well as in the general shop where several strictly junior high school industrial arts subjects are offered.

The most important aims in any junior high school shop are experimentation and exploration; not production or even the development of a high degree of skills. These first courses are intended to help the boy find himself. As far as accomplishment is concerned, he does so to the best of his ability.

In the Senior High School

In the senior high school the picture is somewhat different. Boys are more mature. Projects attempted are somewhat larger and more involved. Periods for the work have been shortened in many schools. Although the aim here is one of general education, we have boys who are definitely pointing toward industry or some type of engineering. They should have fairly substantial as well as accurate equipment with which to work. The working surface, especially on high-speed machinery, should be large enough to prevent accidents from lack of space. Heavy production machinery such as is used for piece work in industry has no place in our shops. Nevertheless, a surfacer in the woodshop, or a milling machine in the machine shop, or even a press in the print shop, should be of such caliber as to make it possible for a boy to do any piece of work in a workmanlike manner. We must

West High School
Drawing

West High School
Woodwork

Print Shop, West High School

West High School Machine Shop

realize that a senior in high school is approaching manhood. He wants to put away toys and work on a real machine—and how proud he is when he is provided with such an opportunity.

Bids and Recommendations

The purchasing of equipment should always be done on the basis of competitive bids secured from reliable concerns. Specifications should be so drawn as to make such bidding possible, the board of education reserving the right to accept or to reject any or all bids. It is through such a system of purchases that economy in buying can be attained in any community. It is the businesslike way to spend the taxpayers' money.

Thirty is the maximum number of students that any shop teacher should have at one time, and there should be work stations and necessary equipment for every boy. It would be much better if the number could be limited to twenty-four. We should not tolerate shop conditions where as many as forty boys are herded into a small room meagerly equipped for twenty students.

The director of industrial arts in the large school system and the shop instructor in a small system should have an opportunity to examine bids on equipment and to make recommendations concerning purchases. They have been employed as experts in this field. They are the ones who will work with the machinery after it has been bought. Their relationship with the superintendent and the board of education should command sufficient respect to make them consulted in such matters. This type of confidence prevails where director or teacher, or both, merit it because of their mature judgment in the recommendation of various purchases. The low bid is not always the best bid. It is a matter of intelligent cooperation between director, teacher, superintendent and board members, who after considering all factors should choose the wisest course under the circumstances.

An Expanding Field

We must continue to increase the pull of our schools if we are to keep the youth of our land in them. Well-equipped shops are a step in this direction. Some day we shall realize that the school experience when at its best, which ends now with graduation from the senior high school, will have to be lengthened. Boys by the thousands are coming out of these schools with no place to go. They should have an opportunity to return to well-equipped schools even after completing the senior high school.

To produce the wide variety of projects shown in the two photographs shown on this page, the industrial arts departments of the Madison public schools must be provided with a wide range of study equipment

STANLEY ELECTRIC TOOL DIVISION

THE STANLEY WORKS

New Britain, Connecticut

STANLEY

"VICTOR" DRILL

No. 124—½" Capacity

A most practical size electric drill for the School Shop. Round shank twist drills and bits, hole saws, countersinks, plug cutters, etc., can be held in this three-jaw geared chuck. Complete line of electric drills, sizes 3/16" up to 7/8".

DRILL STANDS

There is a Stanley Drill Stand available for any Stanley Electric Drill. They make a practical combination for the School Shop.

HAND ROUTER
No. 10
18,000 R. P.M.

Adds the professional touch to projects. High speed produces smooth work—sanding practically unnecessary. It will perform countless woodworking operations—shaping, inlay work, routing, templet work, veining, relief work, grooving, rabbeting, corner beading. Bench Stands and Attachments available for converting to a spindle shaper.

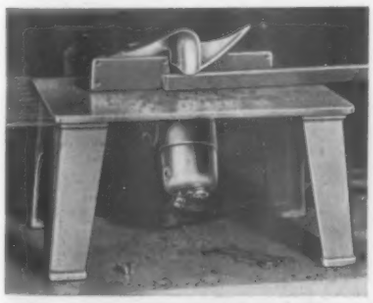
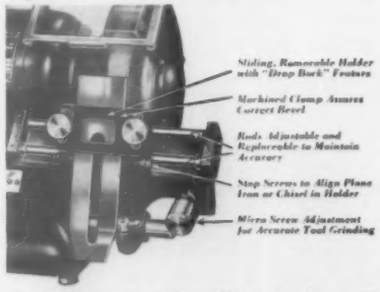


TABLE SHAPER
No. 41

Uses same Motor Unit as Router No. 10. Table has patented motor holder that tilts to 45°. By rearranging 2 or more different cutters on the spindle and by changing angle of motor unit, a wide variety of shaping cuts can be obtained. Steel table top is 12" x 18" x 3/8" on 87/8" gray iron legs.

EDGE TOOL GRINDER
No. 667

Ideal for the School Shop. Ball bearing, 7" x 1" wheels—one wheel specially designed for edge tool grinding, one wheel for general purpose grinding. Motor operates at slow speed. Equipment includes Plane Iron and Chisel Grinding Fixture, Safety Eye Shields, Adjustable Light Fixture.

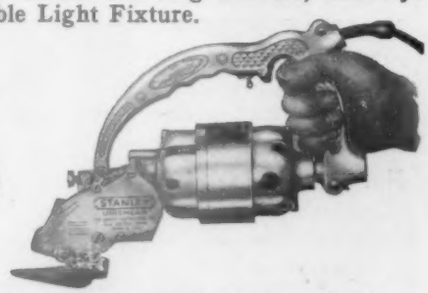

Sliding, Removable Holder with "Drop Back" Feature
Machined Clamp Assures Correct Bevel
Rods Adjustable and Replaceable to Maintain Accuracy
Stop Screws to Align Plane Iron or Chisel in Holder
Micro Screw Adjustment for Accurate Tool Grinding

PLANE IRON AND CHISEL GRINDING FIXTURE
No. 568

Designed to keep edge tools in perfect condition easily and accurately. Furnished with Nos. 667 and 667E Grinders

COMBINATION GRINDER AND SANDER
No. 667E

Ball bearing. Special wheel for edge tool grinding, 7" x 1", 8" sander plate. Sanding discs available for wood or metal work. Motor operates at low speed. Complete with Sanding Plate and a Mounted Disc, Plane Iron and Chisel Grinding Fixture, one Eye Shield, Adjustable Light Fixture.



"MIGHTY MIDGET" UNISHEAR

Motor driven hand shear—easier to handle than a pair of snips. Cuts 18 gauge hot rolled steel or galvanized iron as fast as you can feed it. Cuts large sheets or small pieces easily. 100% safe.

Write for catalog on Stanley Electric Tools and the Stanley Router and Shaper for School Shops.

STANLEY TOOLS

EDUCATIONAL DEPARTMENT

New Britain, Conn.

STANLEY "Boy Proof" TOOLS

FOR WOODWORKING AND FARM SHOPS • ELECTRICAL SHOPS • FORGE SHOPS SHEET METAL SHOPS • AUTOMOBILE SHOPS • MACHINE SHOPS

No. 52½ 10 Oz. HAMMER

Super heat treated head. Evertite oil treated handle of selected straight grain hickory. Patented wedges.

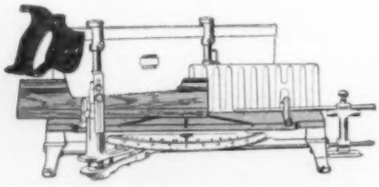
No. R40 EVERLASTING CHISEL

No lost or battered handles. Rubber composition handle, practically unbreakable, moulded about shank. Blade, shank and head one piece of finest steel.

No. 617 HAND DRILL

New chuck with hairpin type springs. Heavy crank, solid wheel, several other important features. ¼" chuck capacity. Hand Drill No. 626 has ⅜" chuck capacity.

No. 2246 MITRE BOX

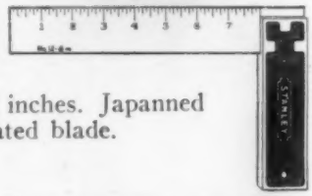


Simplified design. Swivel and uprights one piece of malleable iron. Malleable iron saw guides with roller bearings.

No. 80M SCRAPER

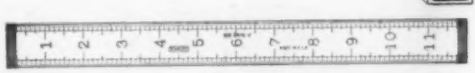
Practically unbreakable. Body and handles one piece of malleable iron.

No. 12 TRY SQUARE



Graduated in eighths of inches. Japanned finish handles. Nickel-plated blade.

No. 34½V BOX-WOOD RULE



Improved vertical figures—easy to read in any position. One side graduated in eighths of inches—other side in sixteenths. Brass tips protect ends.

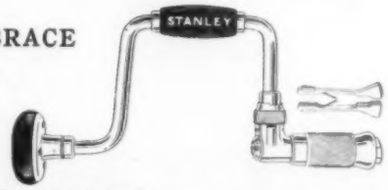
No. 5¼ JUNIOR JACK

Well balanced, lightweight. Ideal size for Junior High School student.

No. 118 BLOCK PLANE

All steel. Minimum number of parts. Lowest cutting angle.

No. 919 BIT BRACE



Self-centering chuck, all parts locked in place. Bronze bushed ball bearing head. Made with 8, 10, 12 and 14 inch sweep.

No. 20 SCREW DRIVER

Standard blade. Blade, shank and head hot forged from one piece of steel.

No. 340 SOLDERING IRON

Electric—95 watts. Pure copper tip. Hermetically sealed heating unit. Hardwood, adjustable handle.

•

SEND FOR SPECIAL SCHOOL CATALOG NO. 34

Catalog 34, in its 240 pages, contains much useful material in addition to complete descriptions and specifications on Stanley Tools. Get your copy free and use it as a handbook for tools and their use.

* * * * * * *

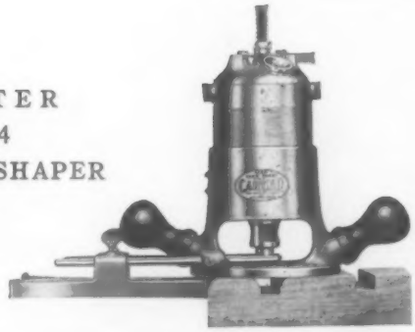
Write for Information on STANLEY VISUAL TEACHING AIDS

THE R. L. CARTER DIVISION

THE STANLEY WORKS

New Britain, Connecticut

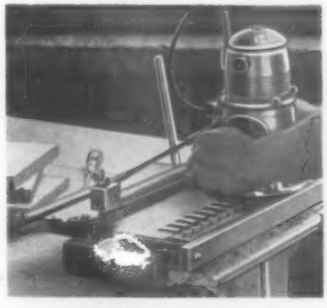
CARTER RS4 ROUTER-SHAPER



This portable electric machine will enable students to finish their projects with a professional touch. With a chuck for bits, it's a Router and can be used for rabbet and dado cuts, inlay work and veining. With an arbor, for cutters, it's a Shaper and can be used to make hundreds of shaping and decorative molding cuts. In addition it can be used with many attachments, some of which are described below.

3/8 H. P. universal motor turns 18,000 R. P. M. Safe, accurate depth adjustment to 1/100th of an inch. Motor housing made of strong aluminum alloy. Priced low enough for the smallest shop.

ATTACHMENTS FOR RS4 UNIT



Dovetail Fixture

With the Carter RS4 Router-Shaper, this Dovetail Fixture guides the bit in making both blind and open dovetails. A single pass across the work completes at one time, the two pieces of any joint up to 13" in width. Average cutting time for the two pieces—**one minute!**

Beading and Fluting Attachment

Beading and fluting is an easy operation to perform with absolute safety with Carter equipment. Work may be held in a lathe or by Carter indexing centers, which assure equal spacing. The motor is simply turned up or down to the correct height, then pushed against and along the work. A guide fastened to the end shield of the motor, regulates depth of cut, but does not revolve and so cannot burn the work.

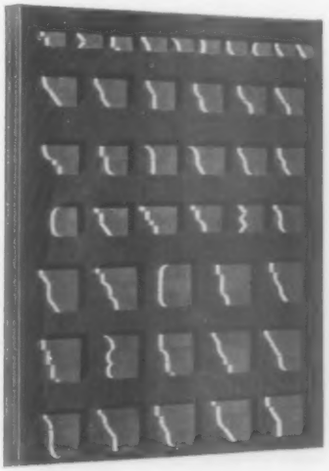
Carter RS4 motor unit can be used in a Shaper Table for a wide variety of decorative molding cuts. Motor unit may also be mounted horizontally on a bench for carving small or large pieces.

CARTER C51 BENCH SHAPER

1 H. P. universal Motor is held under the table in the Carter patented holder that can be tilted from vertical position to any angle up to 45°. The motor spindle projects through the table top and holds one or more cutters. By using a few cutters singly or in combination and by tilting the motor to various angles many different shaping cuts can be made.

Cut-away View of Patented Tilting Feature

Machined steel table top measures 16" x 26". Table is drilled to accommodate straight fence, tension shoe, light fixture and circular guide. A hold down, with spring tension fastens on the straight fence.



MOLDING CUTS MADE WITH CARTER C51 SHAPER

The cuts shown here were made with one cutter or in combinations of two or three cutters. It is possible to make hundreds of different molding cuts on the C51 because of the patented tilting spindle feature. The spindle can be tilted backward up to 45° and forward to 25°. This feature will save you the expense of purchasing special cutters for every job.

BROWN & SHARPE MFG. CO.

Providence, R. I.

"World's Standard of Accuracy"

MILLING MACHINES

Universal — Plain — Vertical, including toolroom and manufacturing types.

GRINDING MACHINES

Universal — Plain — Surface — Cutter and Tool.

SCREW MACHINES

Automatic and Wire Feed (Semi-Automatic).

Detailed Specifications of any size or type of machine gladly sent on request

Investigate the No. 2 Light Type Universal Milling Machine (shown above) —an ideal machine for the school shop

. . . convenient height
. . . easily operated
. . . individual Motor Drive

The Popular Brown & Sharpe Universal Grinding Machines (shown at left) are universally selected for shop instruction because of their versatility

BROWN & SHARPE MFG. CO.

Providence, R. I.

"World's Standard of Accuracy"

MACHINISTS' TOOLS

Micrometers
Calipers
Verniers
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Indicators

MILLING CUTTERS

Plain Milling Cutters
End Mills
Face Mills
Slitting Saws
Gear Cutters
Hobs

MISCELLANEOUS SHOP EQUIPMENT

Arbors and Collets
Ground Flat Stock
Surface Plates
Magnetic Chucks
Vises
Pumps

Catalog of complete line on request

YATES-AMERICAN MACHINE COMPANY

203 ST. LAWRENCE AVE., BELOIT, WISCONSIN

J-45 SPINDLE SANDER

YATES-AMERICAN "J" LINE

With this coordinated group of modern machines you can put into practice the newer, progressive ideas in vocational education. They are safe, sturdy, economical to operate and are built to the same high standards as Yates-American industrial-type equipment.

J-45 SPINDLE SANDER

Oscillating. Ruggedly built for continuous service. Table adjustable vertically and may be tilted 15° right and 45° left. Spindle runs in large sealed ball bearings. Oscillation mechanism is entirely enclosed within the base.

J-50 SHAPER

Heavy base assures smooth operation. Heat-treated table has finely finished surface. Alloy steel spindle runs in precision-type ball bearings which are lubricated by a mist of filtered oil. Cutterhead is completely guarded.

J-18 SURFACER

Every moving part fully enclosed. Has sturdy variable speed drive. Three-knife safety cylinder cutterhead mounted in special high speed ball bearings. One-piece box-type frame. Available in 14″ and 18″ widths.

J-20 VARIETY SAW

Tilting arbor. One piece cast-iron base. Heavy, accurately machined table. Dustproof, fan-cooled, ball bearing motor is totally enclosed. Built-in dust chute. All controls are located within easy reach of operator.

J-40 MORTISER

Motor mounted directly on the spindle—entire unit lowers on gibbed ways. Built-in blower removes chips from work. Hand-wheels provided for raising and lowering table. Can be quickly converted for use as a borer.

J-31 HAND JOINTER

Modern in every respect. Cutterhead speeds of 3600 R.P.M. and 4250 R.P.M. available on direct motor drive and belted motor drive models respectively. Has 2½″ overwidth on infeed table for rabbetting. Table available in 6″ and 8″ widths —36″, 42″ and 50″ lengths.

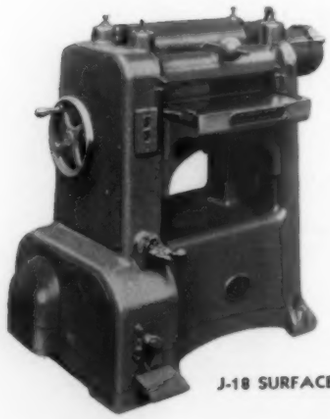
J-47 DISC AND BELT SANDER

Belt sander can be operated horizontally or vertically. An adjustable table is provided for vertical operation. Disc sander is furnished for right and left hand mounting. A compact, versatile machine. Sturdily built.

J-20 VARIETY SAW

J-50 SHAPER

J-40 MORTISER



J-18 SURFACER

J-47 DISC AND BELT SANDER

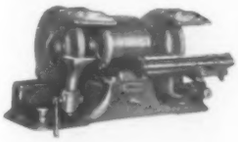
J-31 HAND JOINTER

YATES-AMERICAN

YATES-AMERICAN "W" LINE

These are **primarily,** not incidentally school machines . . . the result of an insistent demand on the part of instructors for a group of Yates-American machines smaller than the "J" Line, but equal in quality. They incorporate modern design, quality construction and accurate workmanship . . . are definitely not "hobby" machines offered on a price basis.

W-55 Variety Saw This 10" tilting arbor variety saw is the newest member of the line. Triple "V" belt or direct motor drive. Heavy welded steel frame. Built-in dust disposal system. Doors give instant access to entire operating mechanism. One-piece 29" x 36" table is ground to a perfect finish—17" cut-off capacity—25" when front table extensions are used. Extra large capacity.



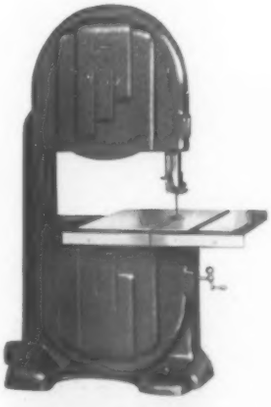
W-80 Grinder Substantially built to resist heavy shock loads and hard usage. Danger zone completely guarded. Equipped with laminated safety glass eye shields. Bit and knife grinding attachment available.

W-90 — W-95 Disc and Belt Sander This combination will perform a wide range of sanding operations. Disc sander has scientifically balanced disc. Belt sander has easily removable hood with cross fence attached.

W-20 Lathe Equipped with MULTISPEED Drive. Speeds can be changed without stopping machine or touching belt. Large capacity—14" swing—31" between centers. Belted, belted motor and direct motor drives.

W-30 Drill Press Equipped with MULTISPEED Drive. Substantial base, rigid supporting columns, built-in spindle lock and depth gauge. Spindle and quill chromium plated. Production type table available.

W-70 Jig Saw Equipped with MULTISPEED Drive offering unusually flexible speed control. Fully enclosed motor and driving assembly located to rear and below table within the base. Modern in design.



W-14 — W-16 Band Saw One-piece, cast-iron frame with built-in dust chute. Trunnion mounted nickel-alloy, cast-iron table. Industrial type straining device. Top and bottom guides are accessible.

W-50 Circular Saw Frame, saw arbor housing and dove-tailed ways are cast in one solid unit. Cannot be sprung out of alignment. Heavy trunnions support nickel-alloy cast-iron table. Eight inch saw.

W-40 Hand Jointer Knives are entirely covered on both sides of fence and fully enclosed below. Fence cannot stick or jam. Industrial type cutterhead. Built-in dust chute. Full length inclined ways.

W-110 Shaper Equipped with exclusive tilting table if desired. Highly polished table needs no breaking in. Choice of 8,000 or 10,000 R.P.M. Completely enclosed. fabric-belt drive. Fully guarded.

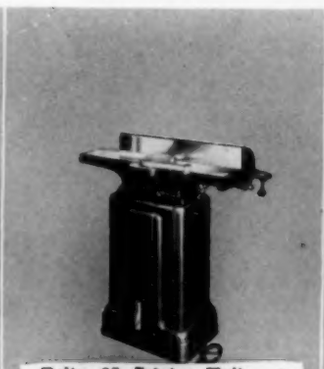
YATES-AMERICAN

THE AMERICAN SCHOOL AND UNIVERSITY—1940

DELTA MANUFACTURING COMPANY

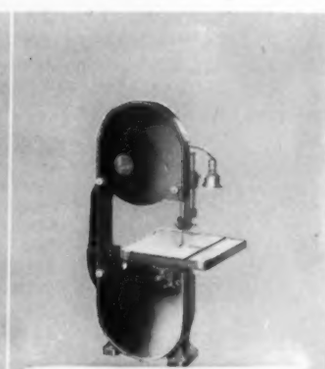
696 E. Vienna Avenue
Milwaukee, Wis.

Delta 10" Tilting Arbor Circular Saw—has many exclusive features



Delta 6" Jointer Unit — a compact, well guarded unit with dual-control handle, patented fence and other special features

Delta Shaper Unit — has maximum safety arrangements and numerous constructional advantages

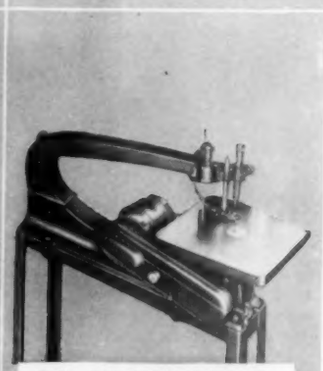


Delta 14" Band Saw—sealed-for-life ball bearings, tilting table. In both wood and metal-cutting models

Delta Pedestal Grinders — the safest, most accurate grinders made

Delta 17" Drill Press—has numerous special features. A full line of 11" and 14" models also available

Delta 12" Lathe—Equipped with sealed-for-life bearings, self-indexing headstock — ideal for school shops



Delta 24" Scroll Saw—Revolutionized modern scroll saw design. Offers minimum vibration and blade breakage

DELTA LOW COST POWER TOOLS for School Shops

You Can Equip New Shops or Modernize Old Shops at a FRACTION OF FORMER COST

It is surprising how small a budget is required to bring obsolete or inadequately equipped school shops up-to-date when the new type low-cost industrial power tools are adopted. By using Delta tools many schools have modernized their shops at 25% of the investment formerly required, and at the same time gained other advantages—such as savings in space, lower operating and maintenance costs, more adequate safety features and immediate delivery. The story of how to teach more pupils for less cost is told in full in the new 1940 catalog of Delta Industrial Power Tools. Send for this catalog and also for FREE new Shop Layout Book containing numerous photographs and floor plans of actual school shops submitted by vocational instructors from all over the country. Shows ingenious solutions of the problems of lighting, space, safety and efficiency.

OLIVER MACHINERY COMPANY

Grand Rapids, Mich.

BRANCH OFFICES

50 Church Street, New York City
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901 Bank of Commerce Building, St. Louis
221 Sexton Building, Minneapolis

METAL SPINNING DEVELOPING RAPIDLY

It is easy to learn and the art possibilities are unlimited. Ask Oliver about Metal Spinning.

Metal Spinning Lathes by Oliver have been developed to the point of Leadership in this line. Lathes are powerful. Boys love the work. Lathes can be used for wood turning also.

"OLIVER" OILSTONE TOOL GRINDERS

Junior with 6" Wheels

Every shop using edge tools should have an Oilstone Grinder.

No. 585, illustrated at right, carries two 8" Oilstone wheels, a dry grinding wheel and emery cone.

"OLIVER" CIRCULAR SAWING MACHINERY

Built in sizes from large, heavy saws to junior models. The "Oliver" No. 232D Tilting Arbor Saw Bench is illustrated. It carries 12 or 13" saws. Motor arbor. Table 33¾ x 34¾.

Other types of "Oliver" saws are Universal Saw Benches, Miter Saws, Variety Saws, Cut-off types, etc.

Important Note: It is impossible with so large a line as the "Oliver" to put specifications into such a small space. We will gladly send to inquirers specifications and literature fully describing any machines in our line.

HIGHER SHOP STANDARDS WITH "OLIVER"

Write for descriptive literature

The No. 189 Hand Planer and Jointer takes its place with other "Oliver" Machines in the esteem of school shop men. The same high quality is evident in its safe, efficient and simplified features of design and the sturdy, trouble-free construction of this model. Built in two sizes, 8" and 12", to handle same width stock, respectively. Other valuable characteristics await your inspection.

The favorite equipment in school shops. Years of satisfactory service in industry preceding school shop acceptance has given "Oliver" a background of experience in providing the school shop requirements.

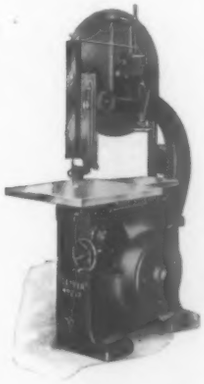
Special cooperation extended to school shop executives in planning and equipping woodworking shops.

"OLIVER" WOOD LATHES

are built in many types and sizes from largest pattern makers' lathes to junior sizes. No. 51, illustrated at right, is a 12" motor head speed lathe giving all speeds from 600 to 3600 r.p.m.

"OLIVER" BAND SAWS

Full line from largest high speed band saws to 18" Junior. We illustrate our popular 30-inch, No. 217.



No. 299 Surfacer is illustrated at right.

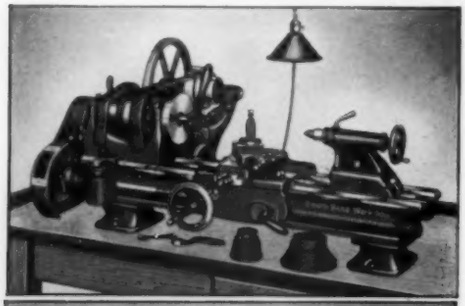
Ask for Details and Prices on "Oliver"

Circular Saw Benches	Sanders (Specify Type)
Band Saws	Boring Machines
Band Saw Brazers	Mortisers
Jig Saws	Tenoners
Carving Machines	Shapers
Surface Planers	Wood Trimmers
Jointers	Oilstone Tool Grinders
Wood Lathes	Electric Glue Pots
Metal Spinning Lathes	Woodworkers Vises

SOUTH BEND LATHE WORKS

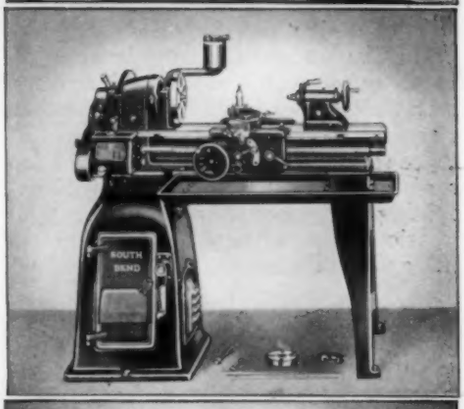
473 East Madison St., South Bend, Ind., U. S. A.

Manufacturers of South Bend, Back-Geared, Screw-Cutting, Precision Lathes; 68 sizes and types of Quick Change Gear and Standard Change Gear Lathes; 9″, 11″, 13″, 14½″ and 16″ swing; 3′ to 12′ bed lengths; Metal Working Precision Lathe Manufacturers for 33 Years



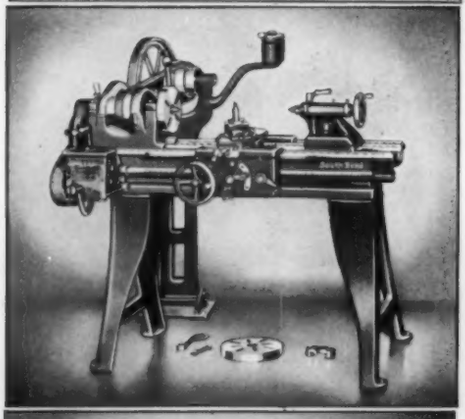
Model C, No. 415-YC, 9″ x 3′ Workshop Back-Geared Screw Cutting Precision Bench Lathe with Horizontal Motor Drive as shown, less bench. Wt. 320 lbs. **$127.00**

Model B, No. 477-Y, 9″ x 3′ Workshop Lathe with power cross feed. **$160.00**

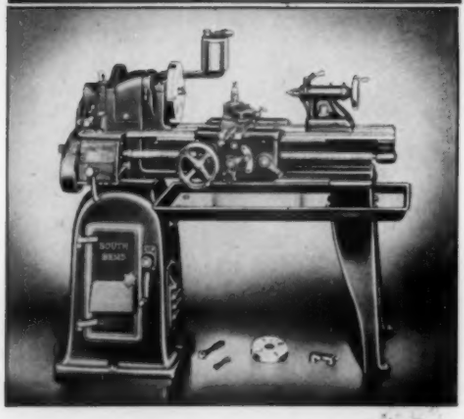


Model A, No. 444-Y, 9″ x 3′ Workshop Lathe with quick change gear and power cross feed. **$210.00**

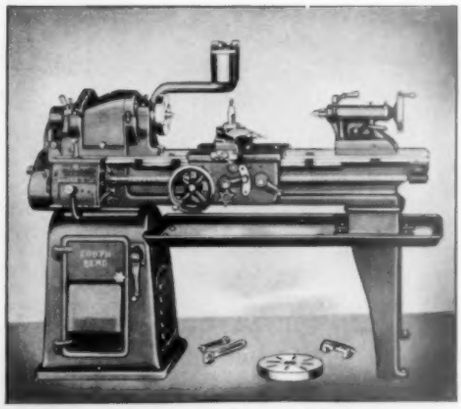
No. 109-Y, 9″ x 3′ Quick Change Gear, Underneath Belt Motor Driven Precision Lathe with ⅓ H.P. Instant Reversing Motor, Chip Pan, and electrical equipment, as shown. Wt. 815 lbs. **$507.00**



No. 911-A, 11″ x 4′ Quick Change Gear, Pedestal Adjustable Motor Driven Precision Lathe with ½ H.P. Instant Reversing Motor, and electrical equipment, as shown. Wt. 863 lbs. **$580.00**



No. 111-A, 11″ x 4′ Quick Change Gear, Underneath Belt Motor Driven Precision Lathe with ½ H.P. Instant Reversing Motor, Chip Pan, and electrical equipment, as shown. Wt. 980 lbs. **$650.00**



No. 113-B, 13″ x 5′ Quick Change Gear, Underneath Belt Motor Driven Precision Lathe with ¾ H.P. Instant Reversing Motor, Chip Pan, and electrical equipment, as shown. Wt. 1560 lbs. **$813.00**

6 INSTRUCTIVE BOOKS with Machine Shop Information

Vocational training for all classes of school shops is shown in these books—Floor plans, projects, types of work, equipment recommended, estimated cost, etc., for the large and small General Shop, the Farm Mechanics Shop, the Vocational Machine Shop, the Motor Mechanics School Shop, Senior and Junior High School Machine Shop, the Technical and Trade School Machine Shop.

School officials, Supervisors and Instructors interested in modern vocational training can have these books sent free of charge postpaid, without obligation, by writing this Company.

Modern School Shops—Containing 32 actual views of outstanding school machine shops in the U. S.

The School Shop—Contains floor plans, equipment costs, types of work for all classes of school shops.

Farm Mechanics in the School Shop — 32 pages of authoritative Farm Mechanics Instruction showing floor plans, projects, equipment, Shop Courses, and other useful information.

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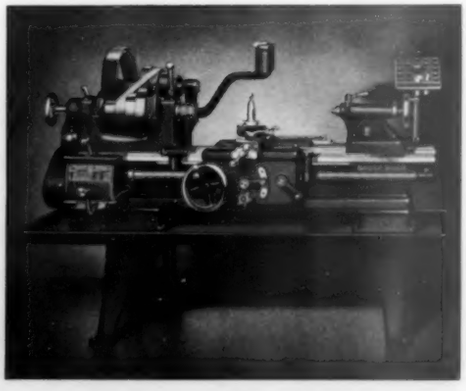

No. 8983-C, 14½″ x 6′ Tool Room Pedestal Adjustable Motor Drive, Quick Change Gear Precision Lathe with 1 H.P. Instant Reversing Motor, Chip Pan, Draw-in Collet Chuck, Taper Attachment, Thread Indicator, Carriage Stop, and electrical equipment, as shown. Wt. 2020 lbs. **$1,116.00**

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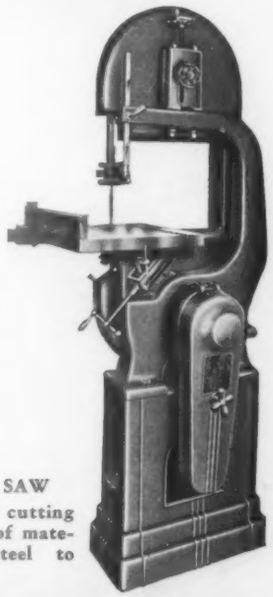

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Sometimes supplied to certain distributors under their own private brand, in which case this symbol ✳ is stamped on the tools.

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The PEXTO line of Sheet Metal Working Machines and Tools offers particular advantages to those planning school shop courses, because students learn their trade on equipment identical in design and operation with that used in commercial sheet metal shops throughout the country. Equally important is PEXTO'S long and successful experience in working with trade and vocational schools throughout the country in laying out efficient and economical shop arrangements. Let us show you how much can be done on a limited appropriation in training students for one of Industry's most interesting and promising fields.

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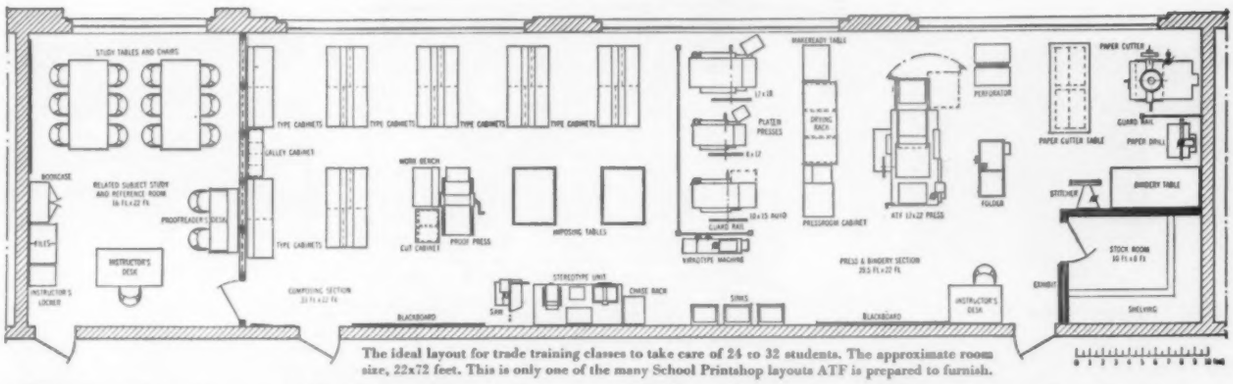

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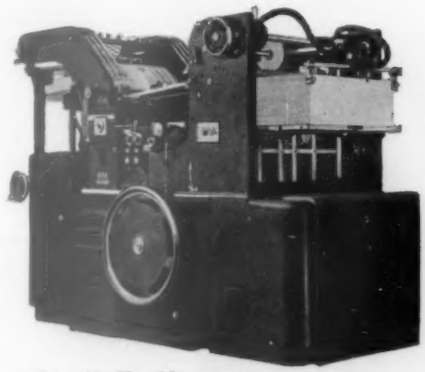

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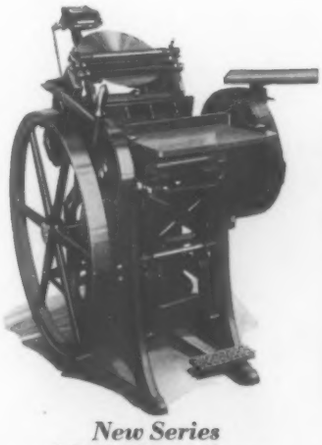

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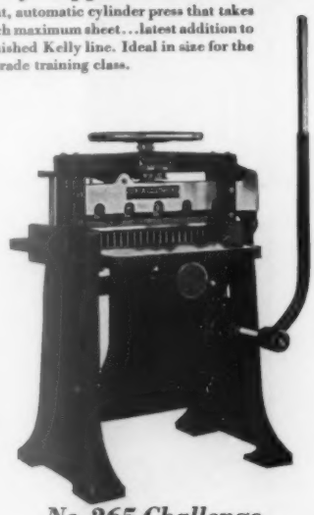

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This 54″ x 45″ bench has 2¼″ maple top, steel supporting frame, steel dust panels, four continuous screw vises, two steel drawers 29″ x 15″ x 5″, four box-type steel lockers 12″ x 15″ x 12″, each drawer and locker having cylinder lock and keys, master-keyed.

This combination of all-steel drawers and lockers with the manual training top, also with continuous screw vises, dogs and stops, is a particularly handy and pleasing one.

The arrangement of drawers and lockers may be used with any "New Britain" bench.

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Send for our Catalog 739 for details of work benches, glue and stain benches, welding benches, cabinet and locker benches, art and drawing tables, etc.

New Britain Cabinet Type Continuous Bench Installation in General Shop

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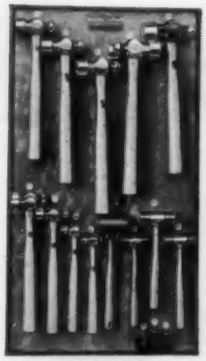
The "New Britain" Stake Bench, for use in sheet metal shops and general shops, is a distinct innovation in the stake bench field. The usual maple top is provided with one or two stake plates and angle-iron edges, mortised and rabbetted flush with the bench top and edge. The shelves, however, are of steel with front and rear edges turned up 2″ forming storage space for steel sheets and stakes, and accommodating standard width sheets in such a way that sharp corners cannot protrude from under the bench to tear clothing. The number of shelves may range from one to six.



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The "None Better" line of tools meets every requirement of the school shop as well as the requirements of mechanics in modern repair shops, garages and industrial plants. The name "None Better" has constantly stood for excellence in quality, reliability and dependability. The tool assortments illustrated on this page include the following:

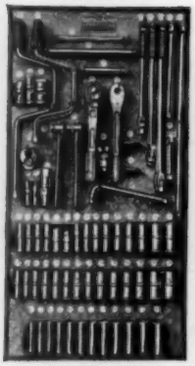
667—¼″ and ⅜″ sockets and attachments
668 Box and open end wrenches
674 Screw driver assortment
678 Plier and adjustable wrenches
679 Chisels, bars and punches
684 Machinists' ball pein assortment
699 Body and fender hammers
685 Fender iron and body repair tools
697 ½″ drive sockets and attachments
6501 ¾″ drive sockets and attachments

Write for Catalog 39 — "None Better" Tools

No. 699

No. 685

No. 6501



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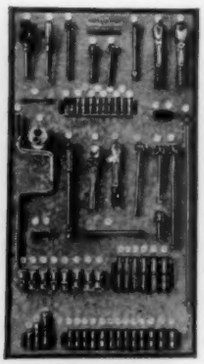

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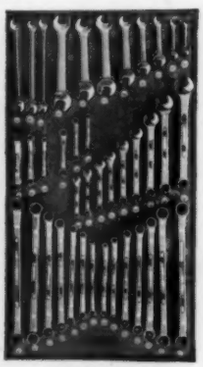

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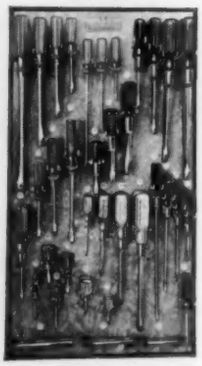

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The Ozalid process is ideal for use in shop and engineering departments where prints of drawings can be made by students at all times.

This process produces positive-type prints which are "contrasty", sharp and easy to read. No liquid surface developing solutions are used. Thus, there is no washing, fixing or drying. Ozalid prints do not curl or wrinkle and once fully developed are light-fast and wash-fast.

In addition to a wide variety of standard Ozalid papers, there is a selection of transparent materials which make possible a number of time-saving operations and short cuts in drafting. These transparent materials are not available in any other method of reproduction.

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MODEL E WHITEPRINT MACHINE

The Model E Whiteprint machine is a printer-developer combination which does a complete job of print making. This machine accommodates materials up to a maximum width of 42 inches.

An office-type Whiteprint machine, Model D, is also available for those interested in reproducing student transcripts, letters, office forms, records, etc.

ELPRO PORTABLE PRINTER

The Elpro printer is ideal for those requiring an occasional print not exceeding size 12 x 18". This machine can be carried from place to place and used either in the classroom or in the field. It consists of an exposing medium of six lamps and a dry development chamber conveniently located behind the reflector.

OZALID DRY DEVELOPING MACHINES

Ozalid developing machines are designed for those already having a printer or blueprinting equipment which can be used as an exposing medium. A range of developers of varying capacities and sizes is available to cover all printroom requirements.

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SECTION XII
TRANSPORTATION SERVICE

MAJOR DEVELOPMENTS IN THE TRANSPORTATION OF PUPILS

BY A. C. LAMBERT

Professor of Educational Administration, and Dean of the Summer School,
Brigham Young University

THIS article is devoted to major developments that are taking place in the field of pupil transportation. It also considers some of the more important problems in the field. Specific statements are made wherever possible, but most of the supporting detail is presented through the facts that are marshaled in the selected footnotes. This method serves two types of readers—those who wish only the general story, and those who require additional specific and technical information.

Rapid Growth of Pupil Transportation

The number of pupils transported at public expense has increased with amazing speed in the last two decades, and in the last ten years there has been a remarkable evolution in the quality of transportation equipment. These facts attract sharp attention of clear minds in public affairs, sociology, education, and business. Pupil-transportation is now a field for serious *study*, by students of education, sociology, and government. As a field of *management*, the transportation of pupils at public expense challenges school administrators with problems analogous to those faced by a father when his adolescent son grows suddenly both broad and tall. As an economic field, pupil-transportation stands in bold relief on the horizon of manufacturers, jobbers, school boards, and retailers. Transportation of pupils is already big business; it will become still bigger.

Reasonably good data show that there are now more than 80,000 school buses operating in the United States at an annual operating expense of about $66,000,000, a figure that excludes charges for investment in equipment, garages, parts and supplies. In 1930 there were only about 42,000 school buses in operation in the United States. Eleven thousand new school buses were produced in 1938. The significance of this activity is shown by the fact that over 3,500,000 children are now carried to and from school each day of the school year. The more intimate and real significance of this big business could be shown only if we had at least a fair sample from about 40,000 close-up pictures of the daily experiences of the 3,500,000 pupils in the improved schools which motor transportation has made possible. These schools exist not only in strictly rural areas but also in semi-urban communities and in cities all over the United States. The daily passage of 80,000 school buses is symptomatic of deep changes that are occurring in educational and social thinking.

Associated intimately with the presence and growth of school transportation are the following forces and movements:

(1) The decline of a pioneer theory of education and the rise of a desire to provide an improved educational opportunity to children of urban, semi-urban, and rural areas alike.

(2) Enlargement of the geographic unit used for local administration of public education and its financial support.

(3) Modification and extension of the boundaries of school-attendance areas.

(4) Popularization of secondary education.

(5) Growth of good roads and highways.

(6) Wide use of motor vehicles by all classes of the population.

(7) Increased confidence in the comfort and safety of vehicles used to transport pupils.

(8) Permissive and mandatory legislation that favors transportation and gives state aid for it.

(9) The tendency for wealth to concentrate personally and geographically.

(10) The increased mobility of the population.

(11) The whole social movement for the improvement of rural life.

Motorized transportation of pupils is an important aspect of modern life, and it is here to stay. The present task is to grasp its significance, and to direct its service. The criteria for the management of transportation may be condensed into these words: Safety, Comfort, Adequacy, Economy, and Flexibility.

Trend to Ownership and Control

Recent data show that about "40 per cent of the school buses are now owned and operated by schools, or by counties, districts, or some similar public educational agency."[1] In 1935 the proportion of school buses operated under school district ownership would not have exceeded 30 per cent. The trend in individual states[2] that have had long experience with pupil transportation, and the trend in the country at large, is clearly in the direction of ownership. The educational and managerial advantages, as well as the demonstrated financial economy, of ownership have emerged, but not because of the dominance of a doctrine that favored it and not because it was the most popular method. Apparently, ownership has established itself as the more satisfactory long-time method, on its own merits and in the face of considerable opposition from local contractors and from superintendents and board members who thought that the contract method meant escape from work and responsibility.

It is not necessary to repeat the numerous arguments[3] that have been made for and against district ownership and operation of school buses, but the evident trend toward ownership seems to be turning upon five considerations: (1) comparative flexibility of the system in daily use; (2) comparative adjustability of transportation as such to the educational and building program; (3) adequacy of control that permits flexibility, adaptation, and sometimes economy; (4) improved ability and therefore additional willingness of superintendents to administer transportation; and (5) comparative financial economy. Upon this last issue numerous published cost studies bear specifically.[4]

[1] *Bus Transportation*, January, 1939, p. 53.

[2] A. C. Lambert: "Ownership of School Buses in Utah," *The American School Board Journal*, Vol. XCVI, No. 4 (April, 1938), pp. 52-53.

[3] *Ibid.* See also Ward G. Reeder: "The Administration of Pupil Transportation," Chapter X. The Educators' Press, Columbus, Ohio. 1939.

[4] Burton H. Belknap: "Transportation Data for 141 Central Districts." University of the State of New York, Bulletin No. 1047, July, 1934.

Frank O. Evans: "Factors Affecting the Cost of School Transportation in California." United States Office of Education, Bulletin, 1930, No. 29.

Marshall Gregory: "Statistics Pertaining to Pupil Transportation in Oklahoma, 1931-1932." Oklahoma State Department of Education, Bulletin No. 136, 1933.

A. C. Lambert: "The Costs of Transporting School Children by Vehicles in the Utah Consolidated School Districts." Utah State Department of Public Instruction. 1931.

M. C. S. Noble: "Public School Bus Transportation in North Carolina, 1930-31." North Carolina State Department of Public Instruction, Publication No. 172.

"Transportation Costs on Contracted Motor Buses in 66 Selected Missouri High Schools." A series of mimeographed tables. Missouri State Department of Public Instruction. 1933.

Roy W. Roberts: "Estimating the Cost of Transportation in Arkansas," Dissertation, Cornell University, 1934.

Improving State Leadership

In many states there is need for improved state leadership in the oversight of pupil transportation. Many states have made great strides in this direction in the last decade. But there is still need for sharper clarification of the functions and responsibilities that are to be shared by various state agencies. For example, state public service commissions, acting under favorable types of laws and in cooperation with Federal agencies, can regulate the number, place, type, and operation of railroad grade crossings that are to be used by school buses and other vehicles. But state departments of education and local school boards cannot do these important and necessary things. State highway patrol officers can check the practices of school-bus drivers as they check other drivers, and they can also approve school buses in the light of state codes and laws that govern all motor vehicles. But state departments of education and local school boards should not wish to take over such immediate police duties. State departments of education, local school superintendents and transportation managers, local school board members and superintendents, state highway commissions, patrol officers, code commissions, bureaus of public health and safety, must all cooperate in formulating minimum standards and specifications for school buses and in setting up the basic rules and regulations for their operation in a given state. The primary leadership and initiative in these matters as they affect school buses seems to rest squarely upon the state department of education. Failure of this department to cooperate continuously with other state and local agencies is poor policy, and embarrassment will surely follow tardy discovery that some other state agencies have moved ahead of the department of education in these matters. There is also the possibility that agencies unfamiliar with educational programs, or even hostile to them, have established types of control over transportation which handicap good educational planning.

State and local road commissioners build the roads, develop the highways and maintain them, and the programs of local school transportation managers are facilitated or retarded by action of these road officials. Here again, cooperation is needed. Local road commissioners must be educated to see that the movement of school buses is not a whim or aberration of local school boards but a basic part of the state's business—to provide reasonably equal educational opportunities to all its children. By legitimate pressure, state and local road officials must at times be encouraged to improve and extend roads, with reasonable attention to the needs of the local school program. School officials must also be alert to pre-

Pupils who are transported considerable distances arrive home earlier than many pupils who walk short distances, and they are completely protected against rain, mud, and snow

Photo by courtesy of the Bender Body Co.

The modern school bus not only suggests the astounding recent improvements in its quality and comfort, but is the symbol of how far America has come from the pioneer theory of education and of society

Photo by Hicks Body Company

Body by one reputable manufacturer, chassis by another; an ensemble that often is practical and economical

Photo by courtesy of Chevrolet Motors

vent final power for designating "approved bus routes" from resting with local or state highway commissions alone; since it is easy for an economy-minded commission (1) to set up a very scanty system of main and secondary state highways (or to extend such systems very slowly), and (2) to confine the approved school-bus routes to the existing state systems of main or secondary highways.

Certain functions are almost wholly local. Local boards of education, acting under wise and helpful cooperation from competent state departments of education, must lay out the systems of individual bus routes and then change and modify them in the light of a whole series of factors with which state highway commissions or public service commissions cannot be adequately familiar. These factors are: (1) the educational program; (2) the desired type of school organization; (3) the type, number, and location of the necessary school buildings; (4) the configuration of the dwelling locations and the community clusters themselves upon the land surface; (5) the pattern and type of roads; (6) the operation of the time factor.[5]

It is reasonable to expect in the next decade an increase in legislation affecting pupil transportation. Not the least immediate need is revision of statutes that now govern the maximum walking distances of pupils.[6] Better legal definition of state responsibility for supervising pupil-transportation is also needed. To clarify the philosophy of the place of pupil-transportation, to clarify the theory of responsibility to be exercised by the several state agencies, and to sharpen the theory of transportation management itself, will be to prevent hasty, ineffective, or dangerous legislation.

In the work that is to be done in securing an improved type of state supervision of transportation, the writer believes earnestly that as a basic principle there should not be a state system of school transportation under complete state centralization of educational administration, and that laws and regulations should not be so framed that they would centralize the entire system in the hands of any one state bureau or department.

The foundations for some of the legislation and for many of the rules and regulations that will appear in the future are being laid now in the experience of numerous local systems, in the work of men who study the field seriously, and in the pooled thinking and group reports of such bodies as The National Association of Public School Business Officials, The National Highway Users Conference, and the Conference of Representatives of the Forty-eight State Education Departments.

[5] A. C. Lambert: "School Transportation," Chapter VII. Stanford University Press, 1938.

[6] The folk-lore nature of these codes in the states generally has been shown by Golden Woolf in his thesis, "Statutory Provisions in the School Codes of Forty-eight States Defining the Need for Transporting Pupils at Public Expense" (Master's Thesis, Brigham Young University, 1936), and reported in abstract form in *School and Society*, Vol. XLV, No. 1172 (June 12, 1937), 816-819.

The present writer has reported in the volume cited in footnote [5] a set of empirical but objective norms for the walking distances of pupils.

Standardization

Commendable efforts are being made for better standardization of school buses and their equipment. But the point to which standardization should be carried is not yet known. It is certain that the rapid evolution from horse-drawn wagons to high-quality motor-buses has left us with a generous sprinkling of archaic vehicles, with numerous vestigial remains, and with a great variety of even the newest buses. The best recent attempt to control excessive variability in this area was the work done by a conference of state school officers, school transportation managers, manufacturers, and engineers held in New York City in May, 1939. The important recommendations of that group are now available in printed form.[7]

The Continued Drive for Safety

Safe transportation for pupils is an absolute necessity; everyone demands it, and school administrators, manufacturers, and highway officials must never cease their attempts to guarantee it. The most important single factor in securing safety in pupil transportation is the use of high-quality bus drivers,—not schoolboys, not school teachers, not old men but drivers skilled in handling heavy buses, men of seasoned judgment, known through tests to be physically sound, mentally alert, and competent in the face of traffic crises. They must be men of character whose personalities win and hold the respect and confidence of pupils and parents. Supporting the human factor there must be high-grade equipment.[8]

With all that transportation managers, drivers, and manufacturers can do, school buses are still subject to hazards from careless drivers of other vehicles, hazards from wind, storm, and "acts of God."

Safety education is a national problem. It is the object of continuous attention by schools. Excellent literature[9] suitable for numerous types of safety education is available. It should be used, advertised, and disseminated by every person who has anything to do with pupil transportation. The drive for safety education is a continuous drive.

[7] "School Bus Standards." Developed and Approved by a Conference of Representatives of the Forty-Eight States, held at Teachers College, New York City. International Textbook Company, Scranton, Pa. 1939. 50¢.

[8] Typical of the vast number of specifications that are being built up in this connection, at least these two sources should be consulted: "School Buses: Safety Equipment and Construction Requirements," National Press Building, Washington, D. C., October 1, 1938, mimeographed, 96 pages; "Safety in Pupil Transportation," Research Bulletin of the National Education Association, Vol. XIV, No. 5, November, 1936, pp. 199-238.

[9] "Safety Education Through Schools," Research Bulletin of the National Education Association, Vol. XVI, No. 5, November, 1938, pp. 239-298 (with excellent bibliography); "Safety and Safety Education, an Annotated Bibliography," National Education Association, 1201 Sixteenth Street, N.W., Washington, D. C., 1939. 64 pp. 25¢.

Above—
Competent and consistent maintenance of school buses insures safety and economy

Photo by courtesy of the International Harvester Company

Circle—
Heads up, Mr. Citizen! Don't rush past that school bus

Photo by courtesy of the Superior Body Company

Left—
After all, attention to details means safety and comfort for children

Photo by courtesy of the Washington State Department of Education

Below—
Modern secondary schools are served by modern buses of varying capacity

Photo by courtesy of the Mack-International Motor Truck Corporation

Improved Organization of Local School Units

No problem is receiving more serious attention among educational leaders and students of public administration than securing larger and more effective units for the local administration of schools and for taxation.[10] Transportation of pupils is tied intimately to this objective, but not everyone understands the significant distinction between the organization of effective local school administrative units and the organization of satisfactory school-attendance areas.[11] The school-attendance area normally is that area or division of a school administrative unit from which pupils go to one particular school plant that houses a distinct group of grades or a major division of the educational program. The school administrative unit comprises the entire territory for which one board of education and its chief administrative office are responsible. In some cases the administrative unit and the one attendance area have identical boundaries, but most administrative units, sometimes called "school districts," contain several attendance areas.

The size and shape of the school attendance area are governed by (1) the number of pupils logically tributary to the plant under the existing school-organization plan, (2) the manner in which the dwellings are scattered over the land, (3) the distance factor, and (4) the time factor. The size and the shape of the school administrative unit need not be governed by the same set of factors. The boundaries of the administrative unit are usually fixed by law; in numerous instances, and in some cases unfortunately, they are identical with the boundaries of some civil unit such as a city, township, or county. There is an important contrast between the fixed legal boundaries of the administrative unit and the relatively flexible boundaries of the school-attendance areas. The boundaries of the administrative unit are commonly defined with the purpose of using it as a local taxing unit, but school-attendance areas are not made for that purpose. Skillful organization of "local school units" requires a good working knowledge of the structure of both administrative units and school-attendance areas, and the structure of attendance areas becomes materially different under the uses of vehicular transportation from what it is under conditions where transportation is not used.

Within a school administrative unit, which may include several attendance areas, if the outside and inside limits for vehicular transportation are known, the educational program, the school organization plan, the plant or building program, and the pupil-transportation program, become one program. The curriculum, the school organization, the size, arrangement, and location of the buildings, the size and form of the attendance areas, and the necessary transportation service, are mutually determined. Furthermore, the judicious use of transportation for pupils may accelerate a dynamic educational and social evolution by means of the improved educational and social situation which it may have made possible in the first instance. Informed transportation managers are also educational and social engineers.

Further description of the nature, structure, and organization of school-attendance areas must be omitted in this treatment, but specific information is available in other sources.[12]

Moving Small Schools

Improvements are being made in the techniques of moving small, expensive, and educationally arid schools, but no transportation enthusiast should work on the theory that every one- or two-room school within an administrative unit should necessarily be abandoned. No worker for improved local administrative units should think that such improvement requires sudden or complete centralization of all small schools. Nor should persons who resist the break-up of the old small-district system do so with the indefensible and untrue argument that the use of enlarged administrative units means inevitably the loss of local power or local interest and participation in the people's schools. Educational, psychological, and sociological mistakes have been made at times through hasty and poorly planned centralization of small schools, but it need not be so. The writer has set forth in another place[13] the main elements in the technique for handling this important problem in educational reorganization. One must always preserve the basic requirements for democracy, for community freedom and integrity, and for healthful local morale politically and educationally.

[10] "The Structure and Administration of Education in American Democracy," Educational Policies Commission, 1938, pp. 1, 33-37, 42.
"Schools in Small Communities," Seventeenth Yearbook, American Association of School Administrators, 1939, Chapter IX.
"Critical Problems in School Administration," Twelfth Yearbook of the Department of Superintendence, N.E.A. 1934, 384 pp. Chapters on the Scope of Education and the Local Administrative Unit.
Walter S. Deffenbaugh and Timon Covert: "School Administrative Units," United States Office of Education Pamphlet No. 34, January, 1933.
E. N. Dietrich and T. C. Holy: "Changes in School Districts and Schools in Ohio." *The American School Board Journal*, Vol. 96, No. 2, February, 1938, pp. 39-41, 87.
Fred Engelhardt, W. H. Zeigel, Wm. S. Proctor, and Scovel Mayo: "District Organization and Secondary Education," United States Office of Education Bulletin 1932, No. 17, National Survey of Secondary Education, Monograph No. 8. 1933, 208 pp. 15¢. Especially pp. 81-82, 93-95, 114-117, 173.
"Handbook of Procedures for Planning the Reorganization of Local School Units," United States Office of Education, Circular No. 156, January, 1936.
R. W. Holmstedt: "Factors Affecting the Organization of School Attendance Units." University of Indiana, School of Education, Bureau of Cooperative Research, Bulletin, V. 10, No. 3, Bloomington, University Book Store, June, 1934, 32 pp.; tables, chart, map.
Barton Morgan and W. H. Lancelot: "A Possible Intermediate Step in the Reorganization of Rural Elementary Education in Iowa." Ames, Iowa, Agricultural Experiment Station, Iowa State College, Research Bulletin, No. 200, pp. 281-330, June, 1936.

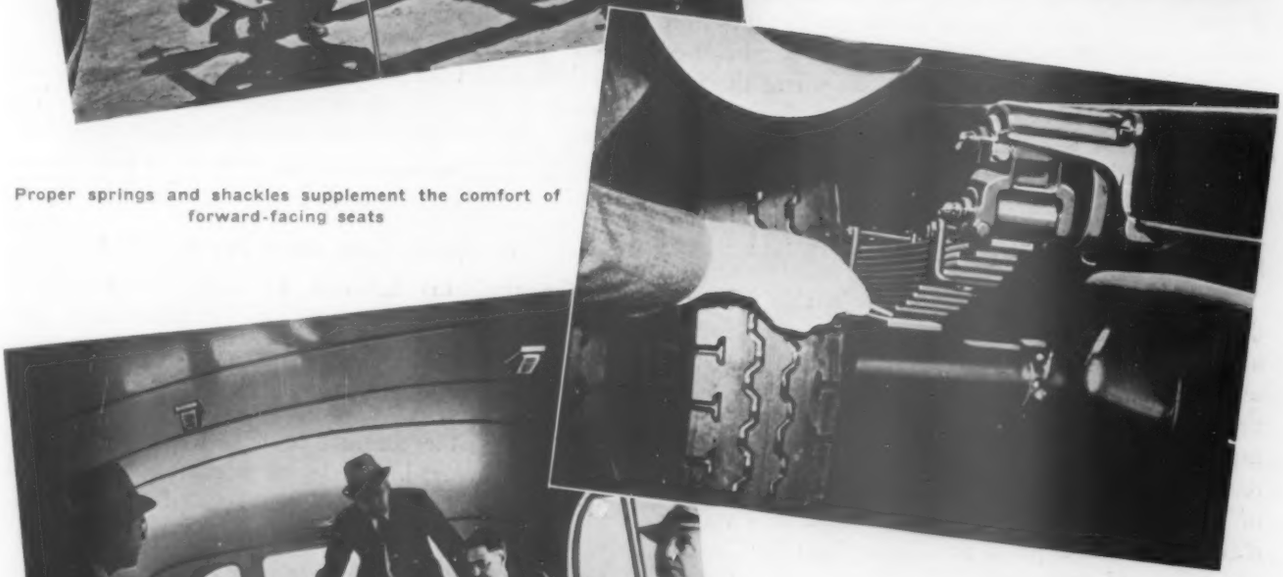
[11] A. C. Lambert: "School Transportation." Stanford University Press, 1938, Chapter III. Also *The American School Board Journal*, Vol. XCIV, No. 6, (June, 1937), 35-38.

[12] *Ibid*, and see also "Handbook of Procedures for Planning the Reorganization of Local School Units." Op. cit.

[13] A. C. Lambert: "School Transportation," op. cit., 19-21.

Conscientious engineers check items on chassis and body that principals and pupils never see

Proper springs and shackles supplement the comfort of forward-facing seats



Safe transportation for children requires cooperation of school superintendent, board member, engineer, manufacturer, shopman, patrol officer, and bus driver

(Photos by courtesy of Yellow Truck and Coach Mfg. Co., General Motors)

Costs and Accounting

In some places great advances have been made in methods of securing cost data and analyzing them. The literature of the field now contains a substantial body of cost studies.[14] But there is still great need for accounts kept in reasonably uniform categories, for cost data that come from different geographic regions, and for cost data that hold certain factors or elements under control. All these things are necessary to provide dependable indications of what may now be roughly termed standard costs. Such "standard costs" are needed not only for major types of rolling stock, but also for repairs, parts and supplies, and for amounts or blocks of transportation service. The available studies of cost show an almost universal need for accurate and uniform classification of accounts, for segregation of current operating expenses from capital outlays and from overhead and depreciation charges. There is need for an acceptable working theory for charging or not charging imputed interest in this field under conditions where the revenue used to purchase buses and garages is raised by taxation or is secured from government subsidy. There is need for cost studies that control such factors as size, type, and age of motor-vehicles, type and gradient of road, length of routes, and size of loads.

But the most urgent of all needs in this matter is the need for better and more uniform classification of accounts. This objective will be approached as school accountants and students of the field show the need for it, and as state departments of education exercise positive leadership in the matter. Accurate cost work is absolutely basic to the ultimate solution of the problem of fitting transportation into various state equalization plans and into plans for distributing Federal revenue to the several states for the improved support of public education.

Transportation of Pupils in Cities

Contrary to popular impression, the transportation of pupils is not confined to the rural and non-city systems. For generations, city school systems have characteristically left to the parents the responsibility and the cost for transporting normal pupils who live beyond reasonable walking distances from the school plants. While reduced fares for city school children are granted widely by car companies, the cost is still met almost universally by the parents and not by the school district. This traditional practice and the use of additional school plants in these areas that are evenly and closely populated have not, however, eliminated the problem of pupil transportation in cities. For some time numerous city school districts have provided bus transportation at public expense for pupils who are physically handicapped. But the number of normal pupils transported at public expense in major cities is increasing.

While most city school administrators say that they have no need for pupil-transportation and no interest in it, it is likely that the spread of the equalization-of-opportunity idea, fostered primarily by and for non-urban areas, will in the future generate a new reverberation in the pleas that will come from city school districts to share in state funds now being granted under various equalization plans that make special grants for the transportation of pupils. This movement already exists. If it spreads, there will probably come from city parents a parallel demand to have the traditional costs of pupil transportation shifted from their purses to the treasury of the school district. This will not only complicate the problem of public-school financing, but city school boards and city school superintendents will then face specific problems of transportation that have long been familiar to administrators of non-city districts. The principles upon which they will solve those new problems are not different in kind from those that govern pupil transportation in the non-city districts.

Complexities of Local Management

The problems incident to managing particular transportation systems are not becoming less. But the experience base and the fact base for meeting these problems are becoming broader and more dependable. For example, methods of financing the change from the contract basis to district ownership are being evolved. While some school systems still face the problems of storing and distributing fuel, oil and parts, service and maintenance techniques are being reduced to a fine science in some other leading systems.

The best methods for carrying insurance, if any, still present a major problem. There is evidence in some of the more recent rulings of courts,[15] and particularly those in the states of California, Washington, and New York, that school boards may not in the future rest so securely in the thought that they need no liability insurance, and that legal liability for damages in cases of accidents will not rest upon them. They may have to assume that responsibility in the future. And in any case, the moral liability incident to possible negligence of bus drivers should never be ignored by school boards.

Other complexities of local management arise not only in the employment and supervision of drivers, but in the perfection of class and activity schedules for both day and evening activities that will permit

[14] See footnote 4.

[15] Ward G. Reeder: "The Administration of Pupil Transportation," 1939, Chapter V, and bibliography.

With good equipment and a careful driver whom children like and respect, mental and physical hazards are eliminated

Photo by courtesy of Dodge Motor

For this ultimate consumer of school transportation the product must be right

Photo by the Wayne Works

The speaking tube not only improves control and morale, but permits instruction to go forward on the bus

Photo by courtesy of the International Harvester Company

BUS DRIVER'S OFFICIAL REPORT AND LOG SHEET. _____ SCHOOL DISTRICT

Route from:_____ to_____ to_____ to_____

Driver:_____ No. of Bus_____ Date filled in:_____

Vehicle Make:_____ Year of Body:_____ Year of Motor:_____ Cylinders_____

Seating: Kind or type:_____ Number (Capacity)_____ H. P. Rating_____

STOPS No.	Place	Clock Hour	Bus Miles from the Elem. Sch.	Bus Miles from the Hi. Sch.	Running Bus Mileage	Dist. between Stops	NUMBER LOADED H.	Jr.	Sr.	Tot.	NUMBER UNLOADED H.	Jr.	Sr.	Tot.	TOTAL ON BOARD
Origin: Garage		7:35			Here										
1	Jones	7:35		19.0	1.0	1.0			2	2					2
2	Smith	7:40	7.0	17.0	3.0	2.0	2			2					4
3	Ransom	7:46	5.0	13.5	6.5	2.5	1		1	2					6
4	Vin's Corner West Bus X	7:51	1.5	11.5	8.5	2.0			4*	4					10
5	Highway Elem.	7:54	0.5	10.5	9.5	1.0									
6	School	7:59	0	10.0	10.0	0.5			4	4	3			3	11
7	Rust	8:05		5.5	14.5	4.5	1**		5	4					15
8	Mills	8:10		3.5	16.5	2.0	1***		2	3					10
9	Mountain Junction	8:15		2.5	17.5	1.0					2 (to Bus)		2		16
10	Hi. School	8:30		0	20.0	2.5							16	16	0
11	White	8:31		7.0	23.0	3.0			4	4					4
12	Owen	8:39		4.0	26.0	3.0			8	8					12
13	Lowe	8:47		2.0	28.0	2.0			6	6					18
14	Hi. School	8:55		0	30.0	2.0							18	18	0

* These four high school pupils are received from Bus X and have traveled 6 miles on Bus X; they are 11.5 miles from the high school at this bus junction, but they live 17.5 miles from the school.
** This elementary pupil rides 5 miles on this bus, transfers to Bus Y at stop 9, and then rides an additional 6 miles to the school he attends.
*** This elementary pupil rides 1 mile on this bus, transfers to Bus Y at stop 9, and then rides an additional 9 miles to the school he attends.

Maximum one-way length of this route: 30.0 Total daily bus miles: 60.0

Miles Paved:_____ Miles gravel:_____ Miles good dirt road:_____ Miles poor dirt road:_____

Number of Bridges:_____ Railway Crossings:_____ Highway Stop Intersects:_____

Total Elapsed Running Time: 47 minutes on trip I; plus 52 minutes on trip II. Mean Running Speed:**_____

Maximum Pupil-load at any time: 18 Total Pupils Served: 30

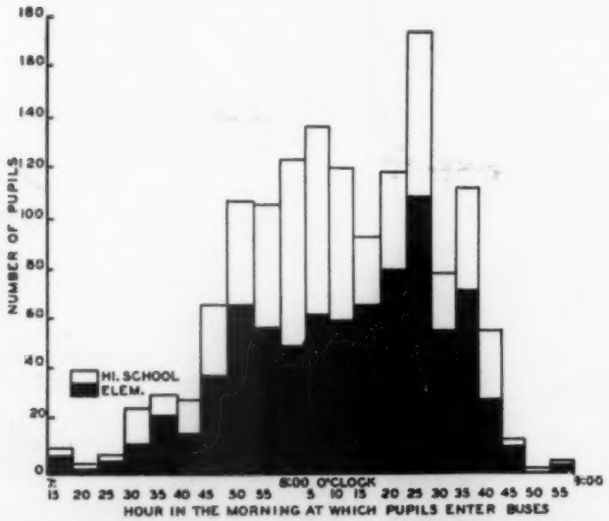
** This is always equal to 60 times the total miles or route, divided by the total number of minutes, required to run the route. In this case: $\frac{60 \times 30}{79}$ equals 22.8 miles per hour

An improved form devised by the author for the school-bus driver's official report and log sheet

transported pupils to participate fully in the whole program of the school. In one senior high school that the writer has studied, only 6 pupils out of a total enrolment of 203 are not transported to that school, and some of the pupils ride more than 20 miles each morning and afternoon. Several groups of pupils who attend this school transfer between buses at three different points each morning and afternoon. Obviously, the timing of bus stops and schedules on the several routes involved must be done with accuracy. And the very difficult problem of providing a comprehensive program for all pupils, and of "making the school a community center" under conditions like these, is obvious to any experienced administrator.

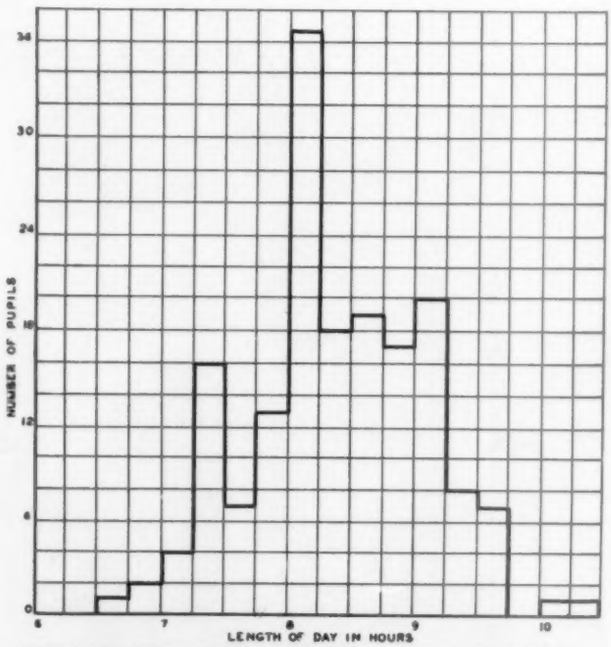
Such personal problems as the length of the school day for transported pupils, and its effects upon them, must not be overlooked. At the particular high school mentioned above, the average length of day for transported pupils as measured in hours between the hour at which they leave their dwellings in the morning and the hour at which they arrive home in the afternoon is 8½ hours, with the third quartile point falling at 8 hours, 55 minutes.

Laying out the bus routes, perfecting the time schedules, designating the stops, and determining the precise limits beyond which pupils will be permitted to ride and within which others must walk, building accurate transportation maps, setting up report forms and records,—all these current local tasks are more complex than they might appear. But techniques for administering the tasks are gradually being perfected, and the next few years should see a certain crystallization of technical theory and device in these fields.



NUMBERS OF PUPILS WHO ENTER THE SCHOOL BUSES AT EACH FIVE-MINUTE INTERVAL IN THE MORNING, UINTAH DISTRICT, UTAH, 1938-1939.

As this graph indicates, even the use of excellent motorized buses does not eliminate the necessity for early rising on the part of transported pupils and their parents



VARIATION IN LENGTH OF SCHOOL DAY FOR SENIOR HIGH SCHOOL PUPILS TRANSPORTED TO THE ALTERRA SCHOOL, UTAH, 1938-1939. LENGTH OF DAY MEASURED FROM HOUR AT WHICH THE PUPIL LEAVES HIS DWELLING IN THE MORNING AND THE HOUR AT WHICH HE ARRIVES HOME IN THE AFTERNOON

The school day for many pupils is a long one; at an hour when many teachers are still sleeping, many of their pupils have long been on the move in school buses

Literally hundreds of little things on the modern big school buses increase the safety margin; windows in the doors, signal lights, front and rear, complete vision for the driver, forward-facing seats, are typical of the care with which buses are manufactured

Photo by courtesy of Rex Body Corp.

Many states now require posting of the state-approved maximum load for each given school bus, an important move toward greater health and safety of pupils

Photo by courtesy of White Motor Company

Reputable manufacturers now build the bus to fit the route, the load and the pupil

Photo by courtesy of Delphi Body Works

Left—A retired veteran of the transportation frontier of ten years ago. The evolution in quality of school buses has been amazing and commendable

Photo by courtesy of Claude Eggertsen

Below—A thoroughly obsolete school bus which provides significant comparison with the vehicles available for current use. This bus was in approved use in an inter-mountain state less than six years ago

Summary

The transportation of pupils is a major activity in the administration of modern elementary and secondary schools. In the last decade the increase in the numbers of vehicles used and the number of pupils transported has been remarkably rapid and more or less unheralded. The vehicles have evolved in type and quality at unequal rates in various sections of the country. Reduction in the number of types and sizes of these buses may be expected to take place soon; the movement to standardize them somewhat is already under way. There is a definite trend toward district ownership and operation of the school buses, with all servicing and maintenance operations coming into the hands of the school authorities as well. Pupil transportation at public expense is increasing in the cities. Safety education rightly continues to occupy a large place in modern life and in modern schools. Increased attention is being given to the definition of state functions and the allocation of state responsibilities for supervision of pupil transportation, but there are no impressive indications that the end of the road in the several states will be, or should be, the creation of one state system of pupil transportation. The writer's personal belief is that there should not be complete state centralization either of schools or of the school transportation systems.

The number and complexity of problems incident to local management of transportation systems are not diminishing, but the theory and the techniques of local management are improving rapidly. Yet there is urgent need for improved classification of accounts and more precise analyses of the costs of transportation. It is becoming clear that accurate cost work in this field is absolutely basic to good local management and to effective programs of state and Federal aid.

The large problem of securing improved local school units is emerging clearly as two-sided, in setting up enlarged administrative units and organizing series of school-attendance areas under the use of vehicular transportation. That this drive for educational and administrative advancement does not imply the sudden or even complete elimination of all small schools, and that it does not mean the loss of local control and local interest in schools, is being seen slowly but clearly. The techniques for moving small schools that are clearly indefensible economically and educationally, are becoming better. This problem is being seen also as one in psychological and social engineering. By and large, the daily movement of 80,000 school buses loaded with 3,500,000 children is symptomatic of profound changes that are taking place in the educational and social life of the United States.

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TEN years ago Superior introduced the first ALL-STEEL school bus body and since then they have always been First to introduce every worthwhile safety and construction feature. Superior is proud of the part they have played in the remarkable evolution of providing safe and comfortable transportation for school children.

No amount of money "saved" by using questionable or antiquated equipment outweighs your responsibility to provide children with the utmost in SAFE transportation. On that score *alone* your choice should be a Superior ALL-STEEL Safety School Bus Body because its electrically welded and riveted construction makes it the safest and strongest.

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SUPERIOR COACH CORPORATION

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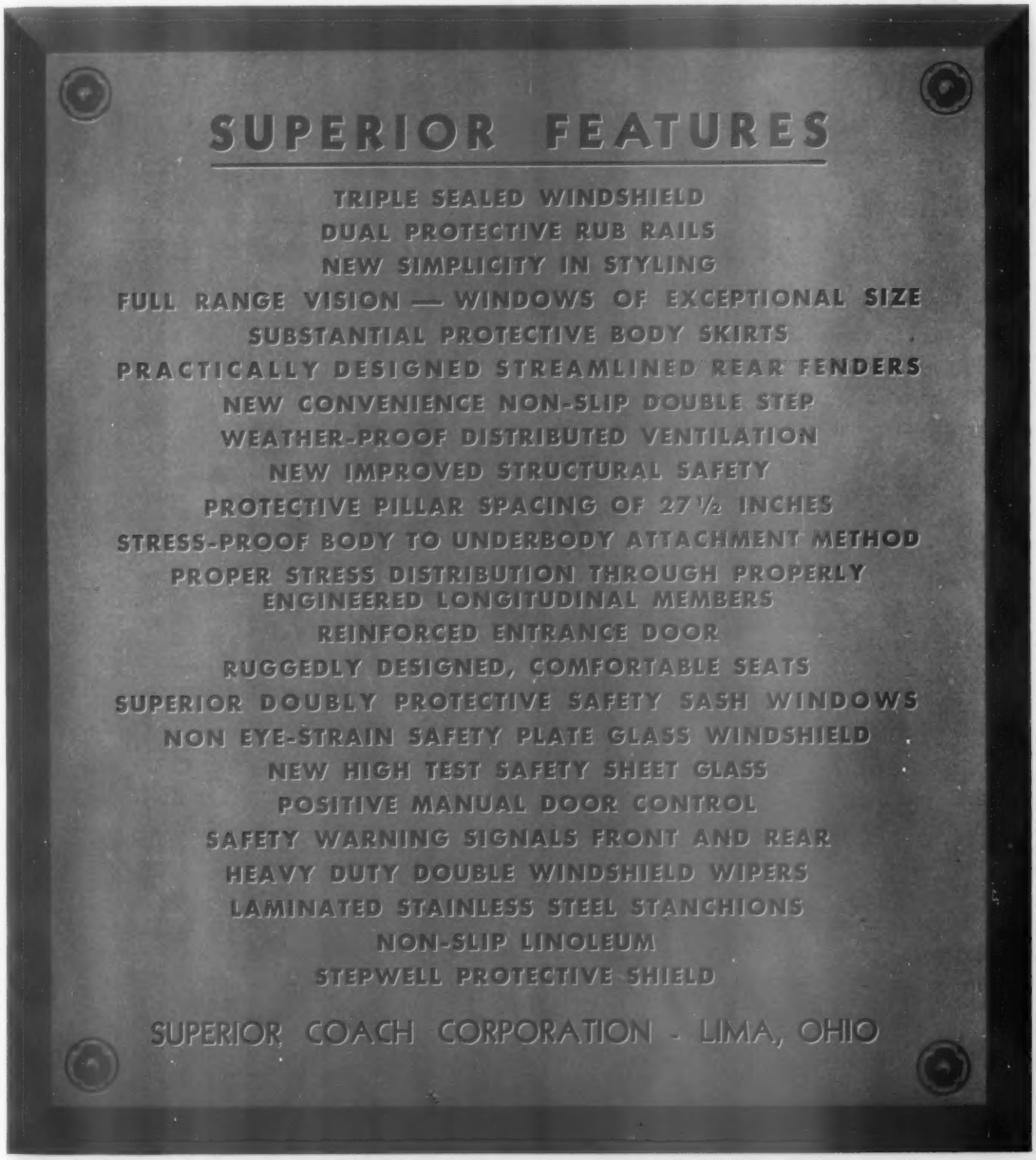
SUPERIOR ALL-STEEL SAFETY SCHOOL BUS BODIES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TRIPLE SEALED WINDSHIELD
DUAL PROTECTIVE RUB RAILS
NEW SIMPLICITY IN STYLING
FULL RANGE VISION — WINDOWS OF EXCEPTIONAL SIZE
SUBSTANTIAL PROTECTIVE BODY SKIRTS
PRACTICALLY DESIGNED STREAMLINED REAR FENDERS
NEW CONVENIENCE NON-SLIP DOUBLE STEP
WEATHER-PROOF DISTRIBUTED VENTILATION
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PROTECTIVE PILLAR SPACING OF 27½ INCHES
STRESS-PROOF BODY TO UNDERBODY ATTACHMENT METHOD
PROPER STRESS DISTRIBUTION THROUGH PROPERLY ENGINEERED LONGITUDINAL MEMBERS
REINFORCED ENTRANCE DOOR
RUGGEDLY DESIGNED, COMFORTABLE SEATS
SUPERIOR DOUBLY PROTECTIVE SAFETY SASH WINDOWS
NON EYE-STRAIN SAFETY PLATE GLASS WINDSHIELD
NEW HIGH TEST SAFETY SHEET GLASS
POSITIVE MANUAL DOOR CONTROL
SAFETY WARNING SIGNALS FRONT AND REAR
HEAVY DUTY DOUBLE WINDSHIELD WIPERS
LAMINATED STAINLESS STEEL STANCHIONS
NON-SLIP LINOLEUM
STEPWELL PROTECTIVE SHIELD
SUPERIOR COACH CORPORATION - LIMA, OHIO

INTERNATIONAL HARVESTER COMPANY
(INCORPORATED)

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They're ECONOMICAL
They're DEPENDABLE

The importance of safety, economy, and dependability in school transportation cannot be emphasized too strongly. In building school bus chassis, International Harvester is guided by these fundamentals. Every International school bus chassis combines sound design, sturdy construction, and modern mechanical refinements to provide safe transportation at low cost.

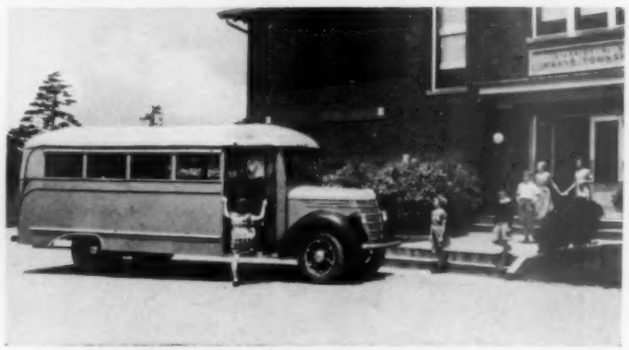
School bus requirements vary with road conditions, lengths of routes, and the number of children to be transported. International chassis are available in standard wheelbase lengths to mount school bus bodies made by any manufacturer. With this coordination of body and chassis, the weight of the buses and the passenger loads are properly distributed between front and rear tires.

Before you invest in school transportation or award hauling contracts, make a thorough investigation and you will see why so many school boards insist on International buses. More than thirty years of experience in the manufacture of quality automotive units is back of Internationals. Service is provided by 240 Company-owned branches and service stations and thousands of International dealers.

Write for the International school bus catalog and for the "School Bus Cost Record"—a simple method of keeping costs on school bus operation and maintenance.

Sturdy chassis and all-steel bodies protect the children

Long wheelbase Internationals for outlying routes



Internationals are safe and economical to operate

Internationals solve school-hauling problems

SECTION XIII

COLLEGE, UNIVERSITY AND NORMAL SCHOOL PRESIDENTS

City	Institution	President
Alabama		
Athens	Athens College	E. R. Naylor
Auburn	Alabama Polytechnic Institute	L. N. Duncan
Birmingham	Birmingham-Southern College	Raymond Ross Paty
Birmingham	Howard College	Harwell G. Davis
Daphne	State Normal School	D. R. Murphey
Florence	State Teachers College	J. A. Keller
Jacksonville	State Teachers College	C. W. Daugette
Livingston	State Teachers College	N. F. Greenhill
Marion	Judson College	L. G. Cleverdon
Montevallo	Alabama College	A. F. Harman
Montgomery	Huntingdon College	Hubert Searcy
Montgomery	State Teachers College	H. C. Trenholm
Selma	Selma University	Wm. H. Dinkins
Spring Hill	Spring Hill College	Wm. D. O'Leary
Talladega	Talladega College	Buell G. Gallagher
Troy	State Teachers College	Chas. B. Smith
Tuskegee Institute	Tuskegee Institute	F. D. Patterson
University	University of Alabama	Richard C. Foster
Arizona		
Flagstaff	Arizona State Teachers College	Thomas J. Tormey
Tempe	Arizona State Teachers College	Grady Gammage
Tucson	University of Arizona	Alfred Atkinson
Arkansas		
Arkadelphia	Henderson State Teachers College	Joseph A. Day
Arkadelphia	Ouachita College	James R. Grant
Batesville	Arkansas College	T. M. Lowry, Jr., Acting
Clarksville	The College of the Ozarks	Wiley Lin Hurie
Conway	Arkansas State Teachers College	H. L. McAlister
Conway	Hendrix College	J. H. Reynolds
Fayetteville	University of Arkansas	J. W. Fulbright
Jonesboro	Arkansas State College	V. C. Kays
Little Rock	Arkansas Baptist College	Tandy W. Coggs
Little Rock	Philander Smith College	M. LaF. Harris
Little Rock	St. John's Seminary	James P. Gaffney
Monticello	Arkansas Agricultural and Mechanical College	Marvin Bankston
North Little Rock	Shorter College	G. A. Gregg
Pine Bluff	Agricultural, Mechanical and Normal College	John B. Watson
Searcy	Harding College	George S. Benson
Siloam Springs	John Brown University	John E. Brown
California		
Angwin	Pacific Union College	Walter I. Smith
Arcata	Humboldt State College	Arthur S. Gist
Berkeley	Pacific School of Religion	A. C. McGiffert
Berkeley	University of California	Robert G. Sproul
Chico	Chico State College	A. J. Hamilton
Claremont	Claremont Colleges	Russell M. Story
Claremont	Pomona College	C. K. Edmunds
Claremont	Scripps College	Ernest J. Jaqua
Fresno	Fresno State College	F. W. Thomas
La Verne	La Verne College	C. Ernest Davis
Los Angeles	Chapman College	C. F. Cheverton
Los Angeles	College of Medical Evangelists	Percy T. Magan
Los Angeles	College of Osteopathic Physicians and Surgeons	P. T. Collinge, Dean
Los Angeles	George Pepperdine College	Hugh M. Tiner
Los Angeles	Immaculate Heart College	Sister Mary Eucharia
Los Angeles	Loyola University of Los Angeles	Charles A. McQuillan
Los Angeles	Mount St. Mary's College	Sister Mary Dolorosa
Los Angeles	Occidental College	Remsen D. Bird
Los Angeles	University of California at Los Angeles	Robert G. Sproul
Los Angeles	University of Southern California	R. B. von KleinSmid
Oakland	College of the Holy Names	Sister Mary Aloyse
Oakland	Mills College	A. H. Reinhardt
Pasadena	California Institute of Technology	Robert A. Millikan, Ch. Exec. Council
Pasadena	Pasadena College	H. Orton Wiley
Redlands	University of Redlands	Elam J. Anderson
St. Mary's	St. Mary's College	Brother Albert
San Diego	San Diego State College	Walter R. Hepner
San Francisco	Golden Gate College	Nagel T. Miner
San Francisco	San Francisco College for Women	Mother Leonor Mejia
San Francisco	San Francisco State College	Alex. C. Roberts
San Francisco	University of San Francisco	William J. Dunne
San Jose	San Jose State College	T. W. MacQuarrie
San Luis Obispo	California Polytechnic School	Julian A. McPhee
San Rafael	Dominican College of San Rafael	Sister Mary Thomas
Santa Barbara	Santa Barbara State College	Clarence L. Phelps
Santa Clara	University of Santa Clara	Louis C. Rudolph
Stanford Univ.	Stanford University	Ray Lyman Wilbur
Stockton	College of the Pacific	Tully C. Knoles
Whittier	Whittier College	W. O. Mendenhall
Colorado		
Alamosa	Adams State Teachers College	Ira Richardson
Boulder	University of Colorado	Robert L. Stearns
Colorado Springs	Colorado College	Thurston J. Davies
Denver	Regis College	R. M. Kelley
Denver	University of Denver	David Shaw Duncan, Chancellor
Fort Collins	Colorado State College of Agriculture and Mechanic Arts	Charles A. Lory
Golden	Colorado School of Mines	M. F. Coolbaugh
Greeley	Colorado State College of Education	G. W. Frasier
Gunnison	Western State College	C. C. Casey
Loretto	Loretto Heights College	Paul J. Ketrick
Connecticut		
Danbury	State Normal College	Ralph C. Jenkins
Hartford	Hartford Theological Seminary	Rockwell H. Potter, Dean
Hartford	Trinity College	Remsen B. Ogilby
Middletown	Wesleyan University	J. L. McConaughy
New Britain	Teachers College of Connecticut	Herbert D. Welte
New Haven	Albertus Magnus College	Sister M. Isabel
New Haven	Arnold College for Hygiene and Physical Education	H. B. Arnold
New Haven	Berkeley Divinity School	Wm. P. Ladd, Dean
New Haven	Connecticut College of Pharmacy	Curtis P. Gladding
New Haven	New Haven State Teachers College	F. E. Engleman
New Haven	Yale University	Charles Seymour
New London	Connecticut College	Katharine Blunt
New London	United States Coast Guard Academy	E. D. Jones
Storrs	The University of Connecticut	Albert N. Jorgensen
West Hartford	St. Joseph College	Mother M. Rinaldo
Willimantic	Willimantic State Teachers College	George H. Shafer
Delaware		
Dover	State College for Colored Students	R. S. Grossley
Newark	University of Delaware	Walter Hullihen
District of Columbia		
Washington	The American University	Joseph M. M. Gray, Chancellor
Washington	Catholic University of America	Joseph M. Corrigan
Washington	Gallaudet College	Percival Hall
Washington	Georgetown University	Arthur A. O'Leary
Washington	George Washington University	Cloyd Heck Marvin
Washington	Howard University	M. W. Johnson
Washington	National University	Leslie C. Garnett Chancellor
Washington	Trinity College	Sister Berchmans Julia
Washington	Washington Missionary College	B. G. Wilkinson
Washington	James Ormond Wilson Teachers College	Edgar C. Higbie

City	Institution	President
Florida		
Coral Gables	University of Miami	B. F. Ashe
Deland	John B. Stetson University	Wm. Sims Allen
Gainesville	University of Florida	John J. Tigert
Lakeland	Florida Southern College	Ludd M. Spivey
Tallahassee	Florida Agricultural & Mechanical College for Negroes	J. R. E. Lee
Tallahassee	Florida State College for Women	Edward Conradi
Tampa	University of Tampa	John H. Sherman
Winter Park	Rollins College	Hamilton Holt
Georgia		
Athens	University of Georgia	Harmon White Caldwell
Atlanta	Atlanta-Southern Dental College	S. W. Foster
Atlanta	Atlanta University	Rufus E. Clement
Atlanta	Clark University	M. S. Davage
Atlanta	Georgia School of Technology	Marion L. Brittain
Atlanta	Morehouse College	Chas. D. Hubert, Acting
Atlanta	Morris Brown College	W. A. Fountain, Jr.
Atlanta	Spelman College	Florence M. Read
Augusta	Paine College	E. C. Peters
Collegeboro	South Georgia Teachers College	M. S. Pittman
Decatur	Agnes Scott College	James R. McCain
Demorest	Piedmont College	Malcolm Boyd Dana
Emory University	Emory University	Harvey W. Cox
Forsyth	Bessie Tift College	C. L. McGinty
Gainesville	Brenau College	H. J. Pearce
Industrial College	Georgia State College	B. F. Hubert
La Grange	La Grange College	H. T. Quillian
Macon	Mercer University	Spright Dowell
Macon	Wesleyan College	Dice R. Anderson
Milledgeville	Georgia State College for Women	Guy H. Wells
Mount Berry	Berry College	Martha Berry
Oglethorpe University	Oglethorpe University	Thornwell Jacobs
Rome	Shorter College	Paul M. Cousins
Valdosta	Georgia State Woman's College	Frank R. Reade
Idaho		
Albion	Albion State Normal School	R. H. Snyder
Caldwell	The College of Idaho	W. W. Hall, Jr.
Lewiston	Lewiston State Normal School	J. E. Turner
Moscow	University of Idaho	Harrison C. Dale
Nampa	Northwest Nazarene College	Russell V. DeLong
Illinois		
Alton	Shurtleff College	Guy Halbert Wimmer
Aurora	Aurora College	Theodore Pierson Stephens
Bloomington	Illinois Wesleyan University	William E. Shaw
Bourbonnais	St. Viator College	E. V. Cardinal
Carbondale	Southern Illinois Normal University	Roscoe Pulliam
Carthage	Carthage College	Rudolph G. Schulz, Jr.
Charleston	Eastern Illinois State Teachers College	Robert G. Buzzard
Chicago	Armour Institute of Technology	Henry T. Heald
Chicago	Central Y. M. C. A. College	Edward J. Sparling
Chicago	Chicago College of Osteopathy	R. N. MacBain
Chicago	Chicago Teachers College	John A. Bartky
Chicago	Chicago Theological Seminary	Albert W. Palmer
Chicago	De Paul University	Michael J. O'Connell
Chicago	George Williams College	Harold C. Coffman
Chicago	Lewis Institute	F. A. Rogers and C. L. Clarke, Acting
Chicago	Loyola University	Samuel K. Wilson
Chicago	Mundelein College	Sister Mary Justitia
Chicago	Pestalozzi Froebel Teachers College	Herman H. Hegner
Chicago	St. Francis Xavier College for Women	Sister Mary Inez
Chicago	The University of Chicago	Robert M. Hutchins
Decatur	James Millikin University	John C. Hessler
De Kalb	Northern Illinois State Teachers College	Karl L. Adams
Elsah	The Principia College of Liberal Arts	Frederic E. Morgan
Elmhurst	Elmhurst College	Timothy Lehmann
Eureka	Eureka College	Burris Dickinson
Evanston	National College of Education	Edna Dean Baker
Evanston	Northwestern University	Franklyn Snyder
Galesburg	Knox College	Carter Davidson
Greenville	Greenville College	H. J. Long
Jacksonville	Illinois College	Harris Gary Hudson
Jacksonville	MacMurray College for Women	C. P. McClelland
Joliet	College of St. Francis	Sister M. Aniceta
Lake Forest	Barat College of the Sacred Heart	Mother R. Gibney
Lake Forest	Lake Forest College	H. McComb Moore
Lebanon	McKendree College	C. R. Yost
Lisle	St. Procopius College	Procopius Neuzil
Macomb	Western Illinois State Teachers College	W. P. Morgan
Monmouth	Monmouth College	James H. Grier
Mundelein	St. Mary of the Lake Seminary	Reynold Hillenbrand
Naperville	North Central College	Edward E. Rall
Normal	Illinois State Normal University	R. W. Fairchild
Peoria	Bradley Polytechnic Institute	F. R. Hamilton
Peru	St. Bede College	Justus Wirth
Quincy	Quincy College	John Koebele
River Forest	Rosary College	Sister Mary Evelyn
Rockford	Rockford College	Mary A. Cheek
Rock Island	Augustana College and Theological Seminary	Conrad Bergendoff
Urbana	University of Illinois	A. C. Willard
Wheaton	Wheaton College	V. R. Edman, Acting
Indiana		
Bloomington	Indiana University	Herman B. Wells
Collegeville	St. Joseph's College	Aloys H. Dirksen
Crawfordsville	Wabash College	Louis B. Hopkins
Danville	Central Normal College	Virgil Hunt, Acting
Evansville	Evansville College	F. Marion Smith
Franklin	Franklin College of Indiana	Wm. Gear Spencer
Goshen	Goshen College	Sanford C. Yoder
Greencastle	DePauw University	Clyde E. Wildman
Hanover	Hanover College	A. G. Parker, Jr.
Holy Cross	St. Mary's College, Notre Dame	Sister M. Madeleva
Huntington	Huntington College	
Indianapolis	Butler University	Daniel Sommer Robinson
Indianapolis	Indiana Central College	I. J. Good
Indianapolis	Indianapolis College of Pharmacy	Edward H. Niles
Indianapolis	Normal College of the American Gymnastic Union	Carl B. Sputh
Lafayette	Purdue University	Edward C. Elliott
Marion	Marion College	Wm. F. McConn
Muncie	Ball State Teachers College	L. A. Pittenger
N. Manchester	Manchester College	Otho Winger
Notre Dame	University of Notre Dame	John F. O'Hara
Oakland City	Oakland City College	W. P. Dearing
Richmond	Earlham College	William C. Dennis
St. Mary-of-the-Woods	St. Mary-of-the-Woods College	Mother Mary Bernard
Terre Haute	Indiana State Teachers College	Ralph N. Tirey
Terre Haute	Rose Polytechnic Institute	Donald B. Prentice
Upland	Taylor University	Robert Lee Stuart
Valparaiso	Valparaiso University	Walter G. Friedrich, Acting
Iowa		
Ames	Iowa State College of Agriculture and Mechanic Arts	Charles E. Friley
Cedar Falls	Iowa State Teachers College	O. R. Latham
Cedar Rapids	Coe College	Harry M. Gage
Davenport	St. Ambrose College	C. H. Meinberg
Decorah	Luther College	O. J. H. Preus
Des Moines	Des Moines College of Pharmacy	F. W. Fitch
Des Moines	Des Moines Still College of Osteopathy	A. D. Becker
Des Moines	Drake University	D. W. Morehouse
Dubuque	Clarke College	Sister Mary Antonia Durkin
Dubuque	Loras College	M. J. Martin
Dubuque	University of Dubuque	Dale D. Welch
Fairfield	Parsons College	Donald L. Hibbard
Fayette	Upper Iowa University	Vivian T. Smith
Grinnell	Grinnell College	John S. Nollen
Indianola	Simpson College	John Owen Gross
Iowa City	State University of Iowa	Eugene A. Gilmore
Le Mars	Western Union College	D. O. Kime
Mount Pleasant	Iowa Wesleyan College	Stanley B. Niles
Mount Vernon	Cornell College	John Benjamin Magee
Oskaloosa	William Penn College	Henry Edwin McGrew
Pella	Central College	Irwin J. Lubbers
Sioux City	Morningside College	Earl A. Roadman
Sioux City	Trinity College	Joseph V. Trunk
Storm Lake	Buena Vista College	Henry Olson
University Park	John Fletcher College	Charles W. Butler
Waverly	Wartburg College	E. J. Braulick

City	Institution	President
Kansas		
Atchison	Mt. St. Scholastica College	Mother M. Lucy Dooley
Atchison	St. Benedict's College	Martin Veth
Baldwin	Baker University	Nelson P. Horn
Emporia	College of Emporia	Dudley Doolittle
Emporia	Kansas State Teachers College	Thomas W. Butcher
Hays	Fort Hays Kansas State College	C. E. Rarick
Lawrence	University of Kansas	Deane W. Malott
Leavenworth	St. Mary College	Arthur M. Murphy
Lindsborg	Bethany College	Ernst F. Pihlblad
McPherson	McPherson College	V. F. Schwalm
Manhattan	Kansas State College of Agriculture and Applied Science	Francis D. Farrell
North Newton	Bethel College	Ed. G. Kaufman
Ottawa	Ottawa University	Andrew B. Martin
Pittsburg	Kansas State Teachers College	W. A. Brandenburg
St. Marys	St. Mary's College	M. Germing
Salina	Kansas Wesleyan University	E. K. Morrow
Salina	Marymount College	Mother Mary Rose Waller
Sterling	Sterling College	H. A. Kelsey
Topeka	Washburn College	Philip C. King
Wichita	Friends University	W. A. Young
Wichita	Municipal University of Wichita	William M. Jardine
Winfield	Southwestern College	Frank E. Mossman
Kentucky		
Barbourville	Union College	Conway Boatman
Berea	Berea College	Francis S. Hutchins
Bowling Green	Western Kentucky State Teachers College	Paul L. Garrett
Covington	Villa Madonna College	Michael Leick
Danville	Centre College of Kentucky	Robt. L. McLeod, Jr.
Frankfort	Kentucky State College	R. B. Atwood
Georgetown	Georgetown College	Henry Noble Sherwood
Lexington	Transylvania College	R. H. McLain
Lexington	University of Kentucky	Frank L. McVey
Louisville	Louisville College of Pharmacy	A. P. Markendorf
Louisville	Louisville Municipal College for Negroes, University of Louisville	Raymond A. Kent
Louisville	Nazareth College	Sister Mary Anastasia Coady
Louisville	Southern Baptist Theological Seminary	John R. Sampey
Louisville	University of Louisville	Raymond A. Kent
Morehead	Morehead State Teachers College	H. A. Babb
Murray	Murray State Teachers College	James H. Richmond
Richmond	Eastern Kentucky State Teachers College	H. L. Donovan
Wilmore	Asbury College	Henry Clay Morrison
Winchester	Kentucky Wesleyan College	Paul Shell Powell
Louisiana		
Hammond	Southeastern Louisiana College	J. Leon Clark
Lafayette	Southwestern Louisiana Institute	Lether E. Frazar
Natchitoches	Louisiana State Normal College	A. A. Fredericks
New Orleans	Dillard University	William S. Nelson
New Orleans	Loyola University of the South	P. A. Roy
New Orleans	The H. Newcomb Memorial, Tulane University College	Frederick Hard, Dean
New Orleans	St. Mary's Dominican College	Sister Mary Vincent
New Orleans	Tulane University of Louisiana	Rufus C. Harris
New Orleans	Ursuline College	Mother Mary B. Bonhomme
New Orleans	Xavier University	Mother M. Agatha
Pineville	Louisiana College	Claybrook Cottingham
Ruston	Louisiana Polytechnic Institute	E. S. Richardson
Scotlandville	Southern University	Felton Clark
Shreveport	Centenary College	Pierce Cline
Shreveport	St. Vincent's College	Mother M. Constance
University	Louisiana State University	Paul M. Hebert, Acting
Maine		
Brunswick	Bowdoin College	Kenneth C. M. Sills
Castine	Eastern State Normal School	William D. Hall
Farmington	State Normal School	Wilbert G. Mallett
Fort Kent	Madawaska Training School	Richard F. Crocker
Gorham	Western State Normal School	Walter E. Russell
Lewiston	Bates College	Clifton D. Gray
Machias	Washington State Normal School	Philip H. Kimball
Orono	University of Maine	Arthur A. Hauck
Presque Isle	Aroostook State Normal School	San L. Merriman
Springdale	Nasson College	Dawn N. Wallace
Waterville	Colby College	Franklin W. Johnson

City	Institution	President
Maryland		
Annapolis	St. John's College	Stringfellow Barr
Annapolis	United States Naval Academy	Wilson Brown, Supt.
Baltimore	College of Notre Dame of Maryland	Sister M. Frances
Baltimore	Goucher College	David A. Robertson
Baltimore	Johns Hopkins University	Isaiah Bowman
Baltimore	Loyola College	Edward B. Bunn
Baltimore	Milton University	Wm. Jas. Heaps
Baltimore	Morgan College	D. O. W. Holmes
Baltimore	St. Mary's Seminary & University	John F. Fenlon
Bowie	State Teachers College	L. S. James
Chestertown	Washington College	Gilbert W. Mead
College Park	University of Maryland	H. C. Byrd
Emmitsburg	Mount St. Mary's College	John L. Sheridan
Emmitsburg	St. Joseph's College	Sister Paula Dunn
Frederick	Hood College	Henry I. Stahr
Frostburg	State Teachers College	John L. Dunkle
Lutherville	Maryland College for Women	Frederick E. Metzger
New Windsor	Blue Ridge College	Homer E. Cooper
Salisbury	State Teachers College	J. D. Blackwell
Towson	State Teachers College	M. Theresa Wiedefeld
Westminster	Western Maryland College	F. G. Holloway
Massachusetts		
Amherst	Amherst College	Stanley King
Amherst	Massachusetts State College	Hugh P. Baker
Boston	Boston University	Daniel L. Marsh
Boston	Emmanuel College	Sister Agnes Cecilia
Boston	Massachusetts College of Pharmacy	H. C. Newton, Dean
Boston	Northeastern University	Carl S. Ell
Boston	Portia Law School and College of Liberal Arts	A. Chesley York
Boston	Simmons College	Bancroft Beatley
Boston	Suffolk University	Gleason L. Archer
Boston	Teachers College of the City of Boston	Wm. H. J. Kennedy
Bridgewater	State Teachers College	John J. Kelly
Cambridge	Harvard University	James B. Conant
Cambridge	Massachusetts Institute of Technology	Karl T. Compton
Cambridge	Radcliffe College	Ada L. Comstock
Chestnut Hill	Boston College	Wm. J. Murphy
Fitchburg	State Teachers College	Charles M. Herlihy
Framingham	State Teachers College	M. F. O'Connor
Hyannis	State Teachers College	Herbert H. Howes
Lowell	Lowell Textile Institute	Charles H. Eames
Lowell	State Teachers College	James Dugan
Medford	Tufts College	Leonard Carmichael
Newton Center	Andover Newton Theological School	Everett C. Herrick
North Adams	State Teachers College	Grover C. Bowman
Northampton	Smith College	Herbert J. Davis
Norton	Wheaton College	John Edgar Park
Salem	State Teachers College	Edward A. Sullivan
South Hadley	Mount Holyoke College	Roswell G. Ham
South Lancaster	Atlantic Union College	G. Eric Jones
Springfield	American International College	Chester S. McGown
Springfield	International YMCA College	Ernest M. Best
Waltham	Middlesex University	C. Ruggles Smith
Wellesley	Wellesley College	Mildred H. McAfee
Westfield	State Teachers College	Edw. J. Scanlon
Weston	Regis College	Sister Genevieve Marie
Williamstown	Williams College	J. P. Baxter, 3rd
Worcester	Clark University	Wallace W. Atwood
Worcester	Holy Cross College	Joseph R. N. Maxwell
Worcester	State Teachers College	Clinton E. Carpenter
Worcester	Worcester Polytechnic Institute	Wat Tyler Cluverius
Michigan		
Adrian	Adrian College	Harlan L. Feeman
Adrian	Siena Heights College	Mother M. Gerald
Albion	Albion College	John L. Seaton
Alma	Alma College	John Wirt Dunning
Ann Arbor	University of Michigan	Alex. G. Ruthven
Battle Creek	Battle Creek College	Emil Leffler
Berrien Springs	Emmanuel Missionary College	H. J. Klooster
Big Rapids	Ferris Institute	M. S. Ward
Detroit	Detroit College of Law	William Krichbaum, Dean
Detroit	Detroit Institute of Technology	Paul Hickey
Detroit	Marygrove College	Sister M. Honora
Detroit	Sacred Heart Seminary	Daniel J. Ryan
Detroit	University of Detroit	Charles H. Cloud
Detroit	Wayne University	David D. Henry, Acting

City	Institution	President
East Lansing	Michigan State College of Agriculture and Applied Science	Robert S. Shaw
Grand Rapids	Calvin College	Johannes Broene, Acting
Hillsdale	Hillsdale College	Willfred Mauck
Holland	Hope College	Wynand Wichers
Houghton	Michigan College of Mining and Technology	Grover C. Dillman
Kalamazoo	Kalamazoo College	Paul L. Thompson
Kalamazoo	Western State Teachers College	Paul V. Sangren
Marquette	Northern State Teachers College	Webster H. Pearce
Mt. Pleasant	Central State Teachers College	Charles L. Anspach
Nazareth	Nazareth College	Sister Mary Kevin
Olivet	Olivet College	Joseph Brewer
Orchard Lake	SS. Cyril and Methodius Seminary and St. Mary's College	L. J. Krzyzosiak
Ypsilanti	Michigan State Normal College	J. M. Munson

Minnesota

Bemidji	State Teachers College	C. R. Sattgast
Collegeville	St. John's University	Alcuin Deutsch
Duluth	College of St. Scholastic	Mother M. Agnes Somers
Duluth	Duluth State Teachers College	Herbert Sorenson
Mankato	State Teachers College	Frank D. McElroy
Minneapolis	Augsburg College and Theological Seminary	Bernhard Christensen
Minneapolis	University of Minnesota	Guy Stanton Ford
Moorhead	Concordia College	J. N. Brown
Moorhead	Moorhead State Teachers College	R. B. MacLean
New Ulm	Dr. Martin Luther College	Carl L. Schweppe
Northfield	Carleton College	Donald J. Cowling
Northfield	St. Olaf College	L. W. Boe
St. Cloud	State Teachers College	George A. Selke
St. Joseph	College of St. Benedict	Mother Rosamond Pratschner
St. Paul	Bethel Institute	G. A. Hagstrom
St. Paul	College of St. Catherine	Sister Eucharista
St. Paul	College of St. Thomas	James H. Moynihan
St. Paul	Hamline University	Charles N. Pace
St. Paul	Macalester College	Charles J. Turck
St. Peter	Gustavus Adolphus College	O. J. Johnson
Winona	College of St. Teresa	Sister Mary A. Molloy
Winona	St. Mary's College	Brother Leopold
Winona	Winona State Teachers College	O. Myking Mehus

Mississippi

Alcorn	Alcorn Agricultural & Mechanical College	Wm. H. Bell
Blue Mountain	Blue Mountain College	Lawrence T. Lowrey
Cleveland	Delta State Teachers College	W. M. Kethley
Clinton	Mississippi College	D. M. Nelson
Columbus	Mississippi State College for Women	B. L. Parkinson
Hattiesburg	Mississippi Woman's College	W. E. Holcomb
Hattiesburg	State Teachers College	J. B. George
Holly Springs	Rust College	L. M. McCoy
Jackson	Belhaven College	G. T. Gillespie
Jackson	Jackson College	B. Baldwin Dansby
Jackson	Millsaps College	M. L. Smith
State College	Mississippi State College	G. D. Humphrey
Tougaloo	Tougaloo College	Judson L. Cross
University	University of Mississippi	A. B. Butts, Chancellor

Missouri

Canton	Culver Stockton College	W. H. McDonald
Cape Girardeau	Southeast Missouri State Teachers College	Walter W. Parker
Columbia	University of Missouri	F. A. Middlebush
Fayette	Central College	Robert H. Ruff
Fulton	Westminster College	F. L. McCluer
Jefferson City	Lincoln University	Sherman D. Scruggs
Kansas City	Kansas City College of Osteopathy & Surgery	Geo. J. Conley
Kansas City	Kansas City-Western Dental College	R. J. Rinehart, Dean
Kansas City	Rockhurst College	Daniel H. Conway
Kansas City	Teachers College of Kansas City	J. C. Bond
Kansas City	University of Kansas City	Clarence R. Decker
Kirksville	Kirksville College of Osteopathy & Surgery	Geo. M. Laughlin
Kirksville	Northeast Missouri State Teachers College	Walter H. Ryle
Liberty	William Jewell College	John F. Herget
Marshall	Missouri Valley College	Thos. Wm. Bibb
Maryville	Northwest Missouri State Teachers College	Uel W. Lamkin
Parkville	Park College	Wm. Lindsay Young
St. Charles	Lindenwood College	John L. Roemer
St. Louis	Concordia Theological Seminary	L. Fuerbringer
St. Louis	Harris Teachers College	C. G. Vannest
St. Louis	Maryville College	Mother M. O. Mouton
St. Louis	St. Louis College of Pharmacy	Robert L. Lund
St. Louis	St. Louis University	H. B. Crimmins
St. Louis	Stowe Teachers College	Ruth Harris
St. Louis	Washington University	George R. Throop, Chancellor
Springfield	Drury College	T. W. Nadal
Springfield	Southwest Missouri State Teachers College	Roy Ellis
Tarkio	Tarkio College	M. Earle Collins
Warrensburg	Central Missouri State Teachers College	G. W. Diemer
Webster Groves	Webster College	George F. Donovan

Montana

Billings	Eastern Montana State Normal School	L. B. McMullen
Billings	Polytechnic Intermountain College	J. S. Pennepacker, Acting
Bozeman	Montana State College	A. L. Strand
Butte	Montana School of Mines	Francis A. Thomson
Dillon	Montana State Normal College	Sheldon E. Davis
Helena	Carroll College	Emmet Riley
Missoula	Montana State University	George F. Simmons

Nebraska

Blair	Dana College	Lawrence Siersbeck
Central City	Nebraska Central College	O. W. Carrell
Chadron	Nebraska State Teachers College	Robert I. Elliott
Crete	Doane College	Bryan S. Stoffer
Fremont	Midland College	Fred C. Weigman
Hastings	Hastings College	J. W. Creighton
Kearney	State Teachers College	Herbert L. Cushing
Lincoln	Nebraska Wesleyan University	Benjamin F. Schwartz
Lincoln	Union College	A. H. Rulkoetter
Lincoln	University of Nebraska	C. S. Boucher, Chancellor
Omaha	Creighton University	Joseph P. Zuercher
Omaha	Duchesne College	Mother Eleanor Regan
Omaha	The Municipal University of Omaha	Rowland Haynes
Peru	Nebraska State Teachers College	W. R. Pate
Seward	Concordia Teachers College	C. F. Brommer
Wayne	State Teachers College	J. T. Anderson
York	York College	D. E. Weidler

Nevada

Reno	University of Nevada	Leon W. Hartman

New Hampshire

Durham	University of New Hampshire	Fred Engelhardt
Hanover	Dartmouth College	Ernest M. Hopkins
Hudson	Rivier College	Sister Marie Madeleine
Keene	Keene Teachers College	Lloyd P. Young
Manchester	St. Anselm's College	Bertrand C. Dolan
Plymouth	Plymouth Teachers College	Ernest L. Silver

New Jersey

Convent Station	College of St. Elizabeth	Sister Marie Jose Byrne
East Orange	Panzer College of Physical Education and Hygiene	Margaret C. Brown
East Orange	Upsala College	Evald B. Lawson
Glassboro	New Jersey State Teachers College	Edgar F. Bunce
Hoboken	Stevens Institute of Technology	Harvey N. Davis
Jersey City	New Jersey State Teachers College	Roy L. Shaffer
Jersey City	St. Peter's College	Dennis J. Comey
Lakewood	Georgian Court College	Mother Mary Cecelia Scully
Madison	Drew University	Arlo Ayres Brown
Montclair	New Jersey State Teachers College	Harry A. Sprague
Newark	Newark College of Engineering	Allan R. Cullimore
Newark	New Jersey State Teachers College	M. Ernest Townsend
Newark	University of Newark	Franklin Conklin, Jr., Acting
New Brunswick	New Jersey College for Women	Margaret T. Corwin, Dean
New Brunswick	Rutgers University	Robert C. Clothier

City	Institution	President
Paterson	New Jersey State Teachers College	C. S. Wightman
Princeton	Princeton Theological Seminary	John A. Mackay
Princeton	Princeton University	Harold W. Dodds
Princeton	St. Joseph's College	Arthur DeC. Hamilton
South Orange	Seton Hall College	James F. Kelley
Trenton	State Teachers College	Roscoe L. West
Zarephath	Alma White College	Arthur K. White

New Mexico

Albuquerque	University of New Mexico	J. F. Zimmerman
El Rito	Spanish-American Normal School	Joseph B. Grant
Las Vegas	New Mexico Normal University	Edward Eyring
Silver City	New Mexico State Teachers College	H. W. James
Socorro	New Mexico School of Mines	C. E. Needham
State College	New Mexico State College of Agriculture & Mechanic Arts	Hugh M. Milton II

New York

Albany	College of St. Rose	Edmund F. Gibbons
Albany	New York State College for Teachers	John M. Sayles, Acting
Alfred	Alfred University	John Nelson Norwood
Annandale-on-Hudson	Bard College, Columbia University	Charles Harold Gray, Dean
Aurora	Wells College	William E. Weld
Brockport	State Normal School	E. C. Hartwell
Bronxville	Sarah Lawrence College	Constance Warren
Brooklyn	Brooklyn College	Harry D. Gideonse
Brooklyn	Long Island University	Tristram W. Metcalfe, Dean
Brooklyn	Polytechnic Institute of Brooklyn	Harry S. Rogers
Brooklyn	Saint Francis College	Brother Columba
Brooklyn	St. John's University	Edward J. Walsh
Buffalo	Canisius College	Francis A. O'Malley
Buffalo	D'Youville College	Sister Grace of the Sacred Heart
Buffalo	State Teachers College	Harry W. Rockwell
Buffalo	University of Buffalo	Samuel Paul Capen, Chancellor
Canton	St. Lawrence University	Laurens H. Seelye
Clinton	Hamilton College	W. H. Cowley
Cortland	Cortland Normal School	H. DeW. DeGroat
Elmira	Elmira College	W. S. A. Pott
Flushing	Queens College	Paul Klapper
Fredonia	State Normal School	L. R. Gregory
Garden City	Adelphi College	Paul Dawson Eddy
Geneseo	State Normal School	James B. Welles
Geneva	Hobart College	William A. Eddy
Hamilton	Colgate University	George B. Cutten
Houghton	Houghton College	Stephen W. Paine
Ithaca	Cornell University	Edmund Ezra Day
Ithaca	Ithaca College	Leonard Bliss Job
Keuka Park	Keuka College	J. Hillis Miller
New Paltz	State Normal School	L. H. van den Berg
New Rochelle	College of New Rochelle	Francis W. Walsh
New York	Auburn Theological Seminary	Walter S. Davison, Executive Director
New York	Barnard College	Virginia C. Gildersleeve, Dean
New York	Biblical Seminary in New York	J. Campbell White, Acting
New York	College of the City of New York	N. P. Mead, Acting
New York	College of Mount St. Vincent	Francis J. Spellman
New York	Columbia University	Nicholas Murray Butler
New York	Cooper Union	Gano Dunn
New York	Fordham University	Robert I. Gannon
New York	General Theological Seminary	H. E. W. Fosbroke, Dean
New York	Hunter College of the City of N.Y.	Eugene A. Colligan
New York	Jewish Theological Seminary of America	Cyrus Adler
New York	Manhattan College	Brother A. Victor
New York	Manhattanville College of The Sacred Heart	Mother Grace C. Dammann
New York	New York Medical College	Claude A. Burrett, Dean
New York	New York University	Harry W. Chase, Chancellor
New York	Savage School for Physical Education	Ella B. Savage
New York	Teachers College, Columbia University	Wm. F. Russell, Dean
New York	Union Theological Seminary	Henry S. Coffin
New York	Yeshiva College	Bernard Revel
Niagara University	Niagara University	Joseph M. Noonan
Oneonta	Hartwick College	Henry J. Arnold
Oneonta	State Normal School	Chas. W. Hunt
Oswego	State Normal School	Ralph W. Swetman
Plattsburg	State Normal School	Charles C. Ward
Potsdam	Clarkson College of Technology	James Shelby Thomas
Potsdam	State Normal School	Clarence O. Lehman
Poughkeepsie	Vassar College	Henry Noble MacCracken
Rochester	Nazareth College of Rochester	Mother Rose Miriam
Rochester	The Colgate-Rochester Divinity School	Albert W. Beaven
Rochester	University of Rochester	Alan Valentine
St. Bonaventure	St. Bonaventure College	Thomas Plassmann
Saratoga Springs	Skidmore College	Henry T. Moore
Schenectady	Union College	Dixon Ryan Fox
Staten Island	Wagner Memorial Lutheran College	Clarence C. Stoughton
Syracuse	New York State College of Forestry	Samuel N. Spring, Dean
Syracuse	City Normal School	Wm. W. Wright
Syracuse	Syracuse University	W. P. Graham, Chancellor
Tarrytown	Marymount College	Mother M. Gerard
Troy	Rensselaer Polytechnic Institute	Wm. O. Hotchkiss
Troy	Russell Sage College	J. L. Meader
West Point	United States Military Academy	J. L. Benedict
White Plains	Good Counsel College	Mother M. Aloysia

North Carolina

Asheville	Asheville Normal & Teachers College	Frank Foster
Boone	Appalachian State Teachers College	B. B. Dougherty
Chapel Hill	University of North Carolina	Frank P. Graham
Charlotte	Johnson C. Smith University	H. L. McCrorey
Charlotte	Queens-Chicora College	Hunter B. Blakely
Cullowhee	Western Carolina Teachers College	H. T. Hunter
Davidson	Davidson College	Walter L. Lingle
Durham	Duke University	Wm. Preston Few
Durham	North Carolina College for Negroes	James E. Shepard
Elizabeth City	Elizabeth City State Teachers College	S. D. Williams, Chairman of Faculty
Elon College	Elon College	Leon E. Smith
Fayetteville	Fayetteville State Teachers College	J. W. Seabrook
Greensboro	Agricultural & Technical College	F. D. Bluford
Greensboro	Bennett College	David D. Jones
Greensboro	Greensboro College	Luther L. Gobbel
Greensboro	Woman's College of the University of North Carolina	W. C. Jackson, Dean
Greenville	East Carolina Teachers College	Leon R. Meadows
Guilford College	Guilford College	Clyde A. Milner
Hickory	Lenoir Rhyne College	P. E. Monroe
High Point	High Point College	G. I. Humphreys
Raleigh	Meredith College	Carlyle Campbell
Raleigh	North Carolina State College of Agriculture & Engineering, University of North Carolina	John W. Harrelson, Dean
Raleigh	St. Augustine's College	Edgar H. Goold
Raleigh	Shaw University	Robert P. Daniel
Red Springs	Flora MacDonald College	Henry G. Bedinger
Salisbury	Catawba College	Howard R. Omwake
Salisbury	Livingstone College	W. J. Trent
Wake Forest	Wake Forest College	Thurman D. Kitchin
Wilson	Atlantic Christian College	H. S. Hilley
Winston-Salem	Salem College	H. E. Rondthaler
Winston-Salem	Winston-Salem Teachers College	F. L. Atkins

North Dakota

Dickinson	State Teachers College	C. E. Scott
Ellendale	State Normal & Industrial School	J. C. McMillan
Fargo	North Dakota Agricultural College	Frank L. Eversull
Grand Forks	University of North Dakota	John C. West
Grand Forks	Wesley College	Charles L. Wallace
Jamestown	Jamestown College	B. H. Kroeze
Mayville	State Teachers College	Cyril Grace
Minot	State Teachers College	Carl C. Swain
Valley City	State Teachers College	James E. Cox

Ohio

Ada	Ohio Northern University	Robert Williams
Akron	University of Akron	H. E. Simmons
Alliance	Mount Union College	Charles Burgess Ketcham
Ashland	Ashland College	Edward G. Mason
Athens	Ohio University	Herman G. James
Berea	Baldwin-Wallace College	Louis Clinton Wright
Bluffton	Bluffton College	Lloyd L. Ramseyer
Bowling Green	Bowling Green State University	F. J. Prout

City	Institution	President
Cedarville	Cedarville College	W. R. McChesney
Cincinnati	Teachers College, Athenaeum of Ohio	Carl J. Ryan, Dean
Cincinnati	University of Cincinnati	Raymond Walters
Cincinnati	Xavier University	Dennis F. Burns
Cleveland	John Carroll University	Edmund C. Horne
Cleveland	Case School of Applied Science	Wm. E. Wickenden
Cleveland	Fenn College	C. V. Thomas
Cleveland	Ursuline College	Mary Concepta Green
Cleveland	Western Reserve University	W. G. Leutner
Columbus	Capital University	Otto Mees
Columbus	The Ohio State University	Howard L. Bevis
Columbus	St. Mary of the Springs College	Sister M. Aloyse
Dayton	University of Dayton	John A. Elbert
Defiance	Defiance College	John W. Claxton
Delaware	Ohio Wesleyan University	Herbert J. Burgstahler
Findlay	Findlay College	H. R. Dunathan
Gambier	Kenyon College	Gordon K. Chalmers
Granville	Denison University	A. A. Shaw
Hiram	Hiram College	Kenneth I. Brown
Kent	Kent State University	K. C. Leebrick
Manchester	Alfred Holbrook College	H. E. Cunningham
Marietta	Marietta College	Harry K. Eversull
Mount St. Joseph	College of Mount St. Joseph	Mother Mary Regina
New Concord	Muskingum College	R. N. Montgomery
Oberlin	Oberlin College	Ernest H. Wilkins
Oxford	Miami University	A. H. Upham
Oxford	Western College	Ralph K. Hickok
Painesville	Lake Erie College	Vivian B. Small
South Euclid	Notre Dame College	Mother Mary Evarista
Springfield	Wittenberg College	Rees Edgar Tulloss
Tiffin	Heidelberg College	Clarence E. Josephson
Toledo	Mary Manse College	Sister Catherine Raynor
Toledo	De Sales College	F. J. Macelwane
Toledo	University of the City of Toledo	Philip Curtis Nash
Westerville	Otterbein College	J. Ruskin Howe
Wilberforce	Wilberforce University	D. O. Walker
Wilmington	Wilmington College	Walter L. Collins
Wooster	The College of Wooster	Charles F. Wishart
Yellow Springs	Antioch College	A. D. Henderson
Youngstown	Youngstown College	Howard W. Jones

Oklahoma

Ada	East Central State Teachers College	A. Linscheid
Alva	Northwestern State College	Charles O. Newlun
Bethany	Bethany-Peniel College	A. K. Bracken
Chickasha	Oklahoma College for Women	M. A. Nash
Durant	Southeastern State Teachers College	T. T. Montgomery
Edmond	Central State College	R. R. Robinson
Enid	Phillips University	Eugene S. Briggs
Goodwell	Panhandle Agricultural & Mechanical College	Edward L. Morrison
Guthrie	Catholic College of Oklahoma for Women	Mother Mary Agnes
Langston	Colored Agricultural & Normal University	B. F. Lee, Acting
Norman	University of Oklahoma	Wm. B. Bizzell
Oklahoma City	Oklahoma City University	A. G. Williamson
Shawnee	Oklahoma Baptist University	John W. Raley
Stillwater	Oklahoma Agricultural & Mechanical College	Henry G. Bennett
Tahlequah	Northeastern State Teachers College	John Vaughan
Tulsa	University of Tulsa	C. I. Pontius
Weatherford	Southwestern State College of Diversified Occupations	James B. Boren

Oregon

Ashland	Southern Oregon State Normal School	Walter Redford
Corvallis	Oregon State College	George W. Peavy
Eugene	University of Oregon	Donald Milton Erb
Forest Grove	Pacific University	John F. Dobbs
La Grande	Eastern Oregon College of Education	Roben J. Maaske
Marylhurst	Marylhurst College	Sister M. Elizabeth Clare
McMinnville	Linfield College	William Graham Everson
Monmouth	Oregon College of Education	Charles A. Howard
Newberg	Pacific College	Levi T. Pennington
Portland	Albany College	Clarence W. Greene
Portland	North Pacific College of Oregon	Herbert C. Miller
Portland	Reed College	Dexter M. Keezer
Portland	University of Portland	Michael J. Early
Salem	Willamette University	Bruce R. Baxter

Pennsylvania

Allentown	Cedar Crest College	Wm. F. Curtis
Allentown	Muhlenberg College	Levering Tyson
Annville	Lebanon Valley College	Clyde A. Lynch
Beaver Falls	Geneva College	M. M. Pearce
Bethlehem	Lehigh University	Clement C. Williams
Bethlehem	Moravian College and Theological Seminary	Wm. N. Schwarze
Bethlehem	Moravian College for Women	Edwin J. Heath
Bloomsburg	State Teachers College	Harvey A. Andruss, Acting
Bryn Athyn	Academy of the New Church	George de Charms
Bryn Mawr	Bryn Mawr College	Marion E. Park
California	California State Teachers College	Robert M. Steele
Carlisle	Dickinson College	Fred P. Corson
Chambersburg	Wilson College	Paul S. Havens
Chester	Crozer Theological Seminary	James H. Franklin
Chester	Pennsylvania Military College	Frank K. Hyatt
Chestnut Hill	Chestnut Hill College	Mother Mary James
Cheyney	State Teachers College	L. P. Hill
Clarion	State Teachers College	Paul G. Chandler
Collegeville	Ursinus College	N. E. McClure
Dallas	College Misericordia	Sister Mary Pierre
Easton	Lafayette College	Wm. Mather Lewis
East Stroudsburg	State Teachers College	Joseph F. Noonan
Edinboro	State Teachers College	Carmon A. Ross
Elizabethtown	Elizabethtown College	Ralph W. Schlosser
Erie	Mercyhurst College	Sister M. de Sales Preston
Erie	Villa Maria College	Joseph J. Wehrle
Gettysburg	Gettysburg College	H. W. A. Hanson
Greensburg	Seton Hill College	J. A. W. Reeves
Greenville	Thiel College	Earl S. Rudisill
Grove City	Grove City College	Weir C. Ketler
Haverford	Haverford College	W. W. Comfort
Huntingdon	Juniata College	Charles C. Ellis
Immaculata	Immaculata College	Francis J. Furey
Indiana	Indiana State Teachers College	Le Roy A. King
Jenkintown	Beaver College	James Elliott Mooney, Acting
Kutztown	State Teachers College	Quincy A. W. Rohrbach
Lancaster	Franklin & Marshall College	John A. Schaeffer
Latrobe	St. Vincent College	Alfred Koch
Lewisburg	Bucknell University	Arnaud C. Marts
Lincoln Univ.	Lincoln University	Walter L. Wright
Lock Haven	State Teachers College	John G. Flowers
Loretto	St. Francis College	Edw. P. M. Caraher
Mansfield	State Teachers College	Lester K. Ade
Meadville	Allegheny College	Wm. P. Tolley
Millersville	State Teachers College	Landis Tanger
New Wilmington	Westminster College	Robert F. Galbreath
Philadelphia	Drexel Institute of Technology	Parke R. Kolbe
Philadelphia	Dropsie College	Cyrus Adler
Philadelphia	Hahnemann Medical College	Joseph S. Conwell
Philadelphia	Jefferson Medical College	Henry K. Mohler, Dean
Philadelphia	La Salle College	Brother E. Anselm
Philadelphia	Philadelphia College of Osteopathy	Edgar O. Holden
Philadelphia	Philadelphia College of Pharmacy & Science	Wilmer Krusen
Philadelphia	St. Joseph's College	Thomas J. Love
Philadelphia	Temple University	Charles E. Beury
Philadelphia	University of Pennsylvania	Thomas S. Gates
Philadelphia	Women's Medical College of Pennsylvania	Chevalier Jackson
Pittsburgh	Carnegie Institute of Technology	R. E. Doherty
Pittsburgh	Duquesne University	J. J. Callahan
Pittsburgh	Mount Mercy College	Mother M. Irenaeus
Pittsburgh	Pennsylvania College for Women	Herbert L. Spencer
Pittsburgh	University of Pittsburgh	John G. Bowman, Chancellor
Reading	Albright College	Harry V. Masters
Rosemont	Rosemont College	Mother Mary Cleophas
Scranton	Marywood College	Mother M. Josepha
Scranton	University of Scranton	Brother D. Edward
Selinsgrove	Susquehanna University	G. Morris Smith
Shippensburg	State Teachers College	A. L. Rowland
Slippery Rock	State Teachers College	C. S. Miller
State College	Pennsylvania State College	Ralph D. Hetzel
Swarthmore	Swarthmore College	Frank Aydelotte
Villanova	Villanova College	E. V. Stanford
Washington	Washington & Jefferson College	Ralph Cooper Hutchison
Waynesburg	Waynesburg College	Paul R. Stewart
West Chester	State Teachers College	Charles S. Swope

City	Institution	President
Rhode Island		
Kingston	Rhode Island State College	Raymond G. Bressler
Providence	Brown University	Henry M. Wriston
Providence	Providence College	John J. Dillon
Providence	Rhode Island College of Education	Robert M. Brown, Acting
Providence	Rhode Island College of Pharmacy and Allied Sciences	A. W. Claflin
South Carolina		
Charleston	The Citadel—The Military College of South Carolina	Chas. P. Summerall
Charleston	College of Charleston	Harrison Randolph
Charleston	Medical College of the State of South Carolina	Robert Wilson
Clemson	Clemson College	Enoch W. Sikes
Clinton	Presbyterian College	William P. Jacobs
Columbia	Allen University	S. R. Higgins
Columbia	Benedict College	J. J. Starks
Columbia	Columbia College	J. Caldwell Guilds
Columbia	University of South Carolina	J. R. McKissick
Due West	Erskine College	Robert C. Grier
Gaffney	Limestone College	R. C. Granberry
Greenville	Furman University	J. L. Plyler
Greenwood	Lander College	J. W. Speake
Hartsville	Coker College	C. Sylvester Green
Newberry	Newberry College	James C. Kinard
Orangeburg	Claflin College	J. B. Randolph
Orangeburg	State Agricultural and Mechanical College	M. F. Whittaker
Rock Hill	Winthrop College	Shelton Phelps
Spartanburg	Converse College	Edward M. Gwathmey
Spartanburg	Wofford College	Henry N. Snyder
Sumter	Morris College	J. P. Garrick
South Dakota		
Aberdeen	Northern State Teachers College	N. E. Steele
Brookings	South Dakota State College of Agriculture & Mechanic Arts	C. W. Pugsley
Huron	Huron College	Milton C. Towner
Madison	Eastern State Normal School	V. A. Lowry
Mitchell	Dakota Wesleyan University	Joseph H. Edge
Rapid City	State School of Mines	Joseph P. Connolly
Sioux Falls	Augustana College	Clemens M. Granskou
Sioux Falls	Sioux Falls College	Warren Palmer Behan
Spearfish	Spearfish Normal School	E. C. Woodburn
Springfield	Southern State Normal School	W. A. Thompson
Vermillion	University of South Dakota	I. D. Weeks
Yankton	Yankton College	G. W. Nash
Tennessee		
Bristol	King College	Thomas P. Johnston
Chattanooga	University of Chattanooga	Archie M. Palmer
Clarksville	Austin Peay Normal School	P. P. Claxton
Cookeville	Tennessee Polytechnic Institute	J. M. Smith
Greeneville	Tusculum College	C. A. Anderson
Harrogate	Lincoln Memorial University	S. W. McClelland
Jackson	Lambuth College	Richard E. Womack
Jackson	Lane College	J. F. Lane
Jackson	Union University	John J. Hurt
Jefferson City	Carson-Newman College	James T. Warren
Johnson City	State Teachers College	C. C. Sherrod
Knoxville	Knoxville College	S. M. Laing
Knoxville	The University of Tennessee	James D. Hoskins
Lebanon	Cumberland University	Ernest L. Stockton
Madison College	Madison College	E. A. Sutherland
Maryville	Maryville College	Ralph Waldo Lloyd
McKenzie	Bethel College	E. K. Reagin
Memphis	Southwestern	Charles E. Diehl
Memphis	State Teachers College	Richard C. Jones, Acting
Milligan College	Milligan College	H. J. Derthick
Murfreesboro	State Teachers College	Q. M. Smith
Murfreesboro	Tennessee College	E. L. Atwood
Nashville	Fisk University	Thomas E. Jones
Nashville	George Peabody College	S. C. Garrison
Nashville	Scarritt College	Jesse Lee Cuninggim
Nashville	Tennessee Agricultural & Industrial State College	W. J. Hale
Nashville	Vanderbilt University	O. C. Carmichael
Sewanee	University of the South	Alexander Guerry
Texas		
Abilene	Abilene Christian College	James F. Cox
Abilene	Hardin-Simmons University	Rupert N. Richardson, Executive Vice President
Abilene	McMurry College	Frank L. Turner
Alpine	Sul Ross State Teachers College	H. W. Morelock
Austin	Samuel Huston College	Stanley E. Grannum
Austin	St. Edward's University	P. J. Haggerty
Austin	Tillotson College	Mary E. Branch
Austin	The University of Texas	Homer P. Rainey
Belton	Mary Hardin-Baylor College	Gordon G. Singleton
Brownwood	Daniel Baker College	T. H. Hart, Acting
Brownwood	Howard Payne College	Thomas H. Taylor
Canyon	West Texas State Teachers College	J. A. Hill
College Station	Agricultural & Mechanical College of Texas	T. O. Walton
Commerce	East Texas State Teachers College	Sam H. Whitley
Dallas	Southern Methodist University	Umphrey Lee
Denton	North Texas State Teachers College	W. J. McConnell
Denton	Texas State College for Women	Louis H. Hubbard
El Paso	Texas College of Mines and Metallurgy	D. M. Wiggins
Fort Worth	Texas Christian University	Edward McS. Waits
Fort Worth	Texas Wesleyan College	Law Sone
Georgetown	Southwestern University	J. W. Bergin
Houston	The Rice Institute	Edgar Odell Lovett
Huntsville	Sam Houston State Teachers College	C. N. Shaver
Kingsville	Texas College of Arts & Industries	J. O. Loftin
Lubbock	Texas Technological College	Clifford B. Jones
Marshall	Bishop College	Joseph J. Rhoads
Marshall	Wiley College	M. W. Dogan
Nacogdoches	Stephen F. Austin State Teachers College	A. W. Birdwell
Prairie View	Prairie View State College	W. R. Banks
San Antonio	Incarnate Word College	Sister M. Columkille
San Antonio	Our Lady of the Lake College	H. A. Constantineau
San Antonio	University of San Antonio	W. W. Jackson
San Marcos	Southwest Texas State Teachers College	C. E. Evans
Seguin	Guadalupe College	J. R. Lockett
Sherman	Austin College	Everett B. Tucker
Tyler	Texas College	D. R. Glass
Waco	Baylor University	Pat M. Neff
Waco	Paul Quinn College	A. S. Jackson
Waxahachie	Trinity University	F. L. Wear
Utah		
Logan	Utah State Agricultural College	Elmer G. Peterson
Provo	Brigham Young University	Franklin S. Harris
Salt Lake City	College of St. Mary-of-the-Wasatch	Sister Mary Agnes
Salt Lake City	University of Utah	George Thomas
Vermont		
Bennington	Bennington College	Robert D. Leigh
Burlington	Trinity College	Sister Mary Emmanuel
Burlington	University of Vermont	Guy W. Bailey
Castleton	State Normal School	Caroline S. Woodruff
Johnson	State Normal School	Donald W. McClelland
Middlebury	Middlebury College	Paul D. Moody
Northfield	Norwich University	John M. Thomas
Winooski Park	St. Michael's College	L. E. Gosselin
Virginia		
Alexandria	Protestant Episcopal Theological Seminary	W. E. Rollins
Ashland	Randolph-Macon College	J. Earl Moreland
Blacksburg	Virginia Polytechnic Institute	Julian A. Burruss
Bridgewater	Bridgewater College	Paul H. Bowman
Charlottesville	University of Virginia	John Lloyd Newcomb
Emory	Emory & Henry College	J. N. Hillman
Ettrick	Virginia State College for Negroes	John M. Gandy
Farmville	State Teachers College	J. L. Jarman
Fredericksburg	Mary Washington College	Morgan L. Combs
Hampden-Sydney	Hampden-Sydney College	Edgar G. Gammon
Hampton	Hampton Institute	Arthur Howe
Harrisonburg	Madison College	S. P. Duke
Hollins College	Hollins College	Bessie C. Randolph
Lawrenceville	St. Paul Normal and Industrial School	J. A. Russell

City	Institution	President
Lexington	Virginia Military Institute	Chas. E. Kilbourne, Supt.
Lexington	Washington & Lee University	Francis P. Gaines
Lynchburg	Lynchburg College	R. B. Montgomery
Lynchburg	Randolph-Macon Woman's College	Theo. Henley Jack
Lynchburg	Virginia Theological Seminary and College	W. H. R. Powell
Radford	State Teachers College at Radford	David W. Peters
Richmond	Medical College of Virginia	William T. Sanger
Richmond	University of Richmond	F. W. Boatwright
Richmond	Virginia Union University	William J. Clark
Salem	Roanoke College	Chas. J. Smith
Staunton	Mary Baldwin College	L. Wilson Jarman
Sweet Briar	Sweet Briar College	Meta Glass
Williamsburg	College of William & Mary	John Stewart Bryan

Washington

Bellingham	Western Washington College of Education	W. W. Haggard
Cheney	Eastern Washington College of Education	Ralph E. Tieje
College Place	Walla Walla College	George W. Bowers
Ellensburg	Central Washington College of Education	Rob't E. McConnell
Pullman	State College of Washington	Ernest O. Holland
Seattle	Seattle Pacific College	Charles H. Watson
Seattle	University of Washington	Lee Paul Sieg
Spokane	Gonzaga University	Leo J. Robinson
Spokane	Holy Names College	Sister Esther Mary
Spokane	Whitworth College	F. T. Hardwick, Acting
Tacoma	College of Puget Sound	Edward H. Todd
Walla Walla	Whitman College	Walter A. Bratton

West Virginia

Athens	Concord State Teachers College	J. Frank Marsh
Bethany	Bethany College	W. H. Cramblet
Bluefield	Bluefield State Teachers College	Henry Lake Dickason
Buckhannon	West Virginia Wesleyan College	Roy McCuskey
Charleston	Morris Harvey College	Leonard Riggleman
Elkins	Davis & Elkins College	Harry E. Whetsell, Chairman, Administrative Committee
Fairmont	Fairmont State Teachers College	Joseph Rosier
Glenville	Glenville State Teachers College	E. G. Rohrbough
Harpers Ferry	Storer College	H. T. McDonald
Huntington	Marshall College	James E. Allen
Institute	West Virginia State College	John W. Davis
Montgomery	New River State College	E. S. Maclin
Morgantown	West Virginia University	Charles E. Lawall
Philippi	Alderson-Broaddus College	John Wesley Elliott
Salem	Salem College	S. Orestes Bond
Shepherdstown	Shepherd State Teachers College	W. H. S. White
West Liberty	West Liberty State Teachers College	Paul N. Elbin

Wisconsin

Appleton	Lawrence College	Thomas N. Barrows
Ashland	Northland College	J. D. Brownell
Beloit	Beloit College	Irving Maurer
Eau Claire	State Teachers College	H. A. Schofield
La Crosse	State Teachers College	Rexford S. Mitchell
La Crosse	Viterbo College	Mother M. Seraphine Kraus
Madison	University of Wisconsin	Clarence A. Dykstra
Menomonie	The Stout Institute	Burton E. Nelson
Milton	Milton College	J. N. Daland, Acting
Milwaukee	Marquette University	Raphael C. McCarthy
Milwaukee	Milwaukee-Downer College	Lucia R. Briggs
Milwaukee	Mount Mary College	Edw. A. Fitzpatrick
Milwaukee	State Teachers College	Frank E. Baker
Nashotah	Nashotah House	E. J. Nutter
Oshkosh	State Teachers College	Forrest R. Polk
Platteville	State Teachers College	Asa M. Royce
Plymouth	Mission House College	Paul Grosshuesch
Ripon	Ripon College	Silas Evans
River Falls	State Teachers College	J. H. Ames
Stevens Point	State Teachers College	E. T. Smith
Superior	State Teachers College	Jim Dan Hill
Watertown	Northwestern College	Erwin E. Kowalke
Waukesha	Carroll College	G. T. Vander Lugt, Dean
West De Pere	St. Norbert College	B. H. Pennings
Whitewater	State Teachers College	C. M. Yoder

Wyoming

Laramie	University of Wyoming	Arthur G. Crane

Possessions

College, Alaska	University of Alaska	Charles E. Bunnell
Honolulu, Hawaii	University of Hawaii	David L. Crawford
Dumaguete, Philippine Islands	Silliman University	Arthur L. Carson
Manila, Philippine Islands	De La Salle College	Brother Xavier
Manila, Philippine Islands	Mapua Institute of Technology	Tomas Mapua
Manila, Philippine Islands	Philippine Normal School	R. K. Gilmore, Supt.
Manila, Philippine Islands	University of the Philippines	Jorge Bocobo
Rio Piedras, Puerto Rico	University of Puerto Rico	Juan B. Soto
San Germán Puerto Rico	Polytechnic Institute of Puerto Rico	Jarvis S. Morris

Canada

Antigonish, N. S.	St. Francis Xavier University	D. J. MacDonald
Belleville, Ont.	Albert College	Bert Howard
Charlottetown, P. E. I.	St. Dunstan's College	J. A. Murphy
Edmonton, Alta.	University of Alberta	W. A. R. Kerr
Fredericton, N. B.	University of New Brunswick	C. C. Jones
Halifax, N. S.	Dalhousie University	Carleton Stanley
Halifax, N. S.	Halifax Ladies College	E. Florence Blackwood
Halifax, N. S.	University of King's College	A. Stanley Walker
Hamilton, Ont.	McMaster University	H. P. Whidden, Chancellor
Kingston, Ont.	Queen's University	R. C. Wallace
Kitchener, Ont.	St. Jerome's College	Wm. G. Borho
Lennoxville, Que.	Bishop's University	A. H. McGreer
London, Ont.	University of Western Ontario	Wm. Sherwood Fox
Montreal, Que.	Loyola College	H. C. McCarthy
Montreal, Que.	McGill University	Frank Cyril James
Ottawa, Ont.	University of Ottawa Normal School	René Camoureux
Quebec, Que.	Laval University	Alexandre Vachau
St. Joseph, N. B.	St. Joseph's University	L. LaPalme
St. Thomas, Ont.	Alma College	P. S. Dobson
Saskatoon, Sask.	University of Saskatchewan	James S. Thomson
Stanstead, Que.	Stanstead Wesleyan College	E. C. Amaron
Toronto, Ont.	University of Toronto	H. J. Cody
Toronto, Ont.	Upper Canada College	T. W. L. MacDermot
Toronto, Ont.	Victoria University	E. W. Wallace
Truro, N. S.	Nova Scotia Agricultural College	Lyman T. Chapman
Vancouver, B. C.	University of British Columbia	Leonard S. Klinck
Winnipeg, Man.	University of Manitoba	Sidney E. Smith
Winnipeg, Man.	United College	W. C. Graham
Wolfville, N. S.	Acadia University	F. W. Patterson

SECTION XIV
PRESIDENTS OF JUNIOR COLLEGES

City	Institution	President
Alabama		
Marion	Marion Institute	Walter I. Murfee
Normal	State Agricultural and Mechanical Institute	J. F. Drake
St. Bernard	St. Bernard College	Boniface Seng
Arizona		
Phoenix	Phoenix Junior College	E. W. Montgomery
Thatcher	Gila Junior College	E. Edgar Fuller
Arkansas		
Conway	Central College	J. S. Rogers
El Dorado	El Dorado Junior College	J. I. McClurkin
Fort Smith	Fort Smith Junior College	J. W. Ramsey
Little Rock	Little Rock Junior College	J. A. Larson
Magnolia	Agricultural & Mechanical College	C. A. Overstreet
Russellville	Arkansas Polytechnic College	J. W. Hull
California		
Arlington	La Sierra College	E. E. Cossentine
Auburn	Placer Junior College	John H. Napier, Jr.
Azusa	Citrus Junior College	F. S. Hayden
Bakersfield	Bakersfield Junior College	Grace V. Bird
Belmont	College of Notre Dame	Sister Helen Bernardine
Berkeley	Armstrong College	J. Evan Armstrong
Berkeley	Williams Junior College	J. W. Hopkins
Brawley	Brawley Junior College	Percy E. Palmer
Coalinga	Coalinga Extension Center	T. A. Ellestad
Compton	Compton Junior College	O. Scott Thompson
El Centro	Central Junior College	Guy A. Weakley
Fullerton	Fullerton Junior College	Louis E. Plummer
Glendale	Glendale Junior College	George H. Geyer, Director
Hollister	San Benito County Junior College	Frank A. Bauman
Kentfield	Marin Junior College	A. C. Olney
Lancaster	Antelope Valley Junior College	David J. Roach
Long Beach	Long Beach Junior College	John L. Lounsbury
Los Angeles	Cumnock Junior College	R. C. Brooks
Los Angeles	Holmby College	Frederica de Laguna
Los Angeles	Los Angeles City College	Rosco C. Ingalls
Los Angeles	Los Angeles Pacific College	W. C. Mavis
Los Angeles	Marymount Junior College	Mother Ignatius
Marysville	Yuba Junior College	Pedro Osuna
Menlo Park	Menlo Junior College	Lowry S. Howard
Modesto	Modesto Junior College	Dwight C. Baker
Oceanside	Oceanside Junior College	Ralph I. Hale
Ontario	Chaffey Junior College	Gardiner W. Spring
Pasadena	Pasadena Junior College	John W. Harbeson
Pomona	Pomona Junior College	J. E. Walker
Porterville	Porterville Junior College	B. H. Grisemer
Reedley	Reedley Junior College	J. O. McLaughlin
Riverside	Riverside Junior College	Arthur G. Paul
Sacramento	Sacramento Junior College	J. B. Lillard
Salinas	Salinas Junior College	Richard J. Werner
San Bernardino	San Bernardino Valley Union Junior College	Nicholas Ricciardi
San Diego	San Diego Junior College	Walter R. Hepner
San Francisco	California School of Mechanical Arts	Ward H. Austin
San Francisco	Cogswell Polytechnical College	George B. Miller
San Francisco	San Francisco Junior College	A. J. Cloud
San Luis Obispo	San Luis Obispo Junior College	Henry A. Cross
San Mateo	San Mateo Junior College	Charles S. Morris
Santa Ana	Santa Ana Junior College	D. K. Hammond
Santa Maria	Santa Maria Junior College	Andrew P. Hill
Santa Monica	Santa Monica Junior College	Elmer C. Sandmeyer
Santa Rosa	Santa Rosa Junior College	Floyd P. Bailey
Stockton	Stockton Junior College	Dwayne Orton
Susanville	Lassen Junior College	N. H. McCollom
Taft	Taft Junior College	John G. Howes
Ventura	Ventura Junior College	D. R. Henry
Visalia	Visalia Junior College	L. J. Williams
Colorado		
Denver	Bellevue Junior College	Ray B. White
Denver	Colorado Woman's College	James E. Huchingson
Grand Junction	Mesa College	Horace J. Wubben
Pueblo	Pueblo Junior College	Charles Haines
Trinidad	Trinidad State Junior College	George J. Kabat
Connecticut		
Bridgeport	Junior College of Connecticut	E. Everett Cortright
New Haven	Larson Junior College	George V. Larson
Norwalk	Hillside School and Junior College	Gretchen Battey
Thompson	Marianapolis College	John C. Navickas
Thompson	Marot Junior College	Mary L. Marot
District of Columbia		
Washington	Arlington Hall Junior College	Carrie Sutherlin
Washington	Chevy Chase Junior College	Philip M. Bail
Washington	Fairmont Junior College	Maud van Woy
Washington	Marjorie Webster Schools, Inc.	Marjorie Webster
Washington	Mount Vernon Seminary	George W. Lloyd
Florida		
Daytona Beach	Bethune-Cookman College	Mary Bethune
St. Petersburg	St. Petersburg Junior College	Robert B. Reed
Sarasota	Ringling Junior College	Verman Kimbrough
West Palm Beach	Palm Beach Junior College	John I. Leonard
Georgia		
Albany	Georgia Normal and Agricultural College	J. W. Holley
Americus	Georgia Southwestern College	Peyton Jacob
Augusta	Junior College of Augusta	Eric W. Hardy
Barnesville	Gordon Military College	J. E. Guillebeau
Carrollton	West Georgia College	I. S. Ingram
Cochran	Middle Georgia College	L. H. Browning
Cuthbert	Andrew College	S. C. Olliff
Dahlonega	North Georgia College	Jonathan C. Rogers
Douglas	South Georgia College	J. M. Thrash
Milledgeville	Georgia Military College	J. H. Jenkins
Mount Vernon	Brewton-Parker Institute	A. M. Gates
Norman Park	Norman Junior College	Paul Carroll
Savannah	Armstrong Junior College	Ernest A. Lowe
Tifton	Abraham Baldwin Agricultural College	G. H. King
Waleska	Reinhardt College	W. M. Bratton
Young Harris	Young Harris College	T. Jack Lance
Idaho		
Boise	Boise Junior College	Eugene B. Chaffee
Coeur d'Alene	Coeur d'Alene Junior College	Orrin E. Lee
Pocatello	University of Idaho, Southern Branch	J. R. Nichols, Exec. Dean
Rexburg	Ricks College	Hyrum Manwaring
Illinois		
Alton	Monticello College	George I. Rohrbough
Carlinville	Blackburn College	William M. Hudson
Chicago	Herzl City Junior College	Wm. H. Johnson
Chicago	Morgan Park Junior College	Albert G. Dodd, Dean
Chicago	North Park College	Algoth Ohlson
Chicago	Woodrow Wilson Junior College	John A. Bartky, Dean
Chicago	Wright Junior College	W. H. Conley, Dean
Cicero	Morton Junior College	William P. MacLean
Evanston	Evanston Collegiate Institute	T. Otmann Firing
Harvey	Thornton Junior College	William E. McVey
Joliet	Joliet Junior College	Clarence Lee Jordan
La Grange	Lyons Township Junior College	Ross Holt

City	Institution	President
La Salle	La Salle-Peru-Oglesby Junior College	Frank A. Jensen
Lincoln	Lincoln College	Wm. D. Copeland
Mt. Carroll	Frances Shimer Junior College and Preparatory School	A. C. Bro
Springfield	Springfield Junior College	Mother Stanislaus
Wilmette	Mallinkrodt College	Mother Sebastian

Indiana

Fort Wayne	Concordia College	Ottomar Krueger
Gary	Gary College	Herbert S. Jones
Kokomo	Kokomo Junior College	Hurd Allyn Drake
Vincennes	Vincennes University	Walter A. Davis

Iowa

Albia	Albia Junior College	Donald O. Smith, Dean
Bloomfield	Bloomfield Junior College	E. T. Carlstedt
Boone	Boone Junior College	J. R. Thorngren, Dean
Britt	Britt Junior College	L. J. Thies
Burlington	Burlington Junior College	Robert White, Jr.
Cedar Rapids	Mount Mercy Junior College	Sister Mary Maura
Centerville	Centerville Junior College	E. W. Fannon
Chariton	Chariton Junior College	F. A. Lunan, Dean
Clarinda	Clarinda Junior College	Herbert L. Glynn
Clinton	Mount St. Clare Junior College	Mother M. Paul Carrico
Creston	Creston Junior College	V. L. Sanders, Dean
Des Moines	Dowling College	J. J. Boylan
Des Moines	Grand View College	Alfred C. Nielsen
Eagle Grove	Eagle Grove Junior College	Gerald Shepherd, Dean
Elkader	Elkader Junior College	D. L. Wood
Emmetsburg	Emmetsburg Junior College	R. W. Newell
Estherville	Estherville Junior College	Warner Kirlin, Dean
Forest City	Waldorf College	J. L. Rendahl
Fort Dodge	Fort Dodge Junior College	Harris Dickey, Dean
Hopkinton	Lenox College	Orville E. Eckberg, Dean
Independence	Independence Junior College	F. E. Mueller, Dean
Iowa Falls	Ellsworth Junior College	Arthur L. Williams
Lamoni	Graceland College	George N. Briggs
Marshalltown	Marshalltown Junior College	B. R. Miller
Maquoketa	Maquoketa Junior College	E. L. Miller, Dean
Mason City	Mason City Junior College	James Rae
Muscatine	Muscatine Junior College	Willetta Strahan, Dean
Orange City	Northwestern Junior College	Jacob Heemstra
Osceola	Osceola Junior College	Lillian V. Hjort, Dean
Ottumwa	Ottumwa Heights College	Mother Mary Geraldine Upham
Red Oak	Red Oak Junior College	J. R. Inman
Sheldon	Sheldon Junior College	W. C. Jackman
Tipton	Tipton Junior College	D. J. Kelley
Washington	Washington Junior College	Harland W. Mead
Waukon	Waukon Junior College	B. K. Orr
Webster City	Webster City Junior College	W. D. Wesselink, Dean

Kansas

Arkansas City	Arkansas City Junior College	C. E. St. John
Chanute	Chanute Junior College	W. W. Bass, Dean
Coffeyville	Coffeyville Junior College	W. M. Ostenberg, Dean
Dodge City	Dodge City Junior College	R. C. Hunt, Dean
El Dorado	El Dorado Junior College	Earl Walker, Dean
Fort Scott	Fort Scott Junior College	W. S. Davison, Dean
Garden City	Garden City Junior College	J. R. Jones, Dean
Haviland	Friends Bible College	Charles A. Beals
Hays	St. Joseph's College and Military Academy	Alfred Carney
Hesston	Hesston College & Bible School	Milo Kauffman
Highland	Highland Junior College	C. M. Rankin, Dean
Hillsboro	Tabor College	Abraham E. Janzen
Hutchinson	Hutchinson Junior College	C. M. Lockman, Dean
Independence	Independence Junior College	E. R. Stevens, Dean
Iola	Iola Junior College	R. H. Carpenter
Kansas City	Kansas City Junior College	J. F. Wellemeyer
McPherson	Central College	Orville S. Walters
Paola	College of Paola and Ursuline Academy	Mother Jerome Schaub
Parsons	Parsons Junior College	E. F. Farner, Dean
Wichita	Sacred Heart Junior College	Leon A. McNeill
Winfield	St. John's College	Carl S. Mundinger

Kentucky

Campbellsville	Campbellsville College	D. J. Wright
Columbia	Lindsey Wilson Junior College	Aaron P. White
Covington	Villa Madonna College	Michael Leick
Hopkinsville	Bethel Woman's College	J. W. Gaines
Jackson	Lees Junior College	J. O. Van Meter
London	Sue Bennett College	Kenneth C. East
Louisville	Sacred Heart College	Mother M. Roberta
Maple Mount	Mount St. Joseph Junior College	Sister M. Christina Eckmans, Dean
Nazareth	Nazareth Junior College and Academy	Sister Margaret Gertrude, Dean
Paducah	Paducah Junior College	R. G. Matheson, Jr.,
Pikeville	Pikeville College	Harry M. Crooks
Pippapass	Caney Junior College	Charles H. Houghton
St. Catherine	St. Catherine Junior College	Mother Mary Louis
Williamsburg	Cumberland College	James L. Creech

Louisiana

Grand Coteau	College of the Sacred Heart	Mother Fitzwilliam
Lafayette	De La Salle Normal School	Brother A. Arsenius
Monroe	Northeast Junior College	C. C. Colvert, Dean
Shreveport	Dodd College	A. L. Tatum, Dean

Maine

Portland	Westbrook Junior College	Milton D. Proctor

Maryland

Baltimore	Mt. St. Joseph's College	Brother Oswald
Catonsville	St. Charles College	George A. Gleason
Forest Glen	National Park College	Roy T. Davis
St. Mary's City	St. Mary's Female Seminary—Junior College	M. Adele France

Massachusetts

Auburndale	Lasell Junior College	Guy M. Winslow
Bradford	Bradford Junior College	Dale Mitchell, Acting
Cambridge	Cambridge School of Liberal Arts	Irving T. Richards, Director
Dudley	Nichols Junior College	James L. Conrad
Newton	Mt. Ida Junior College	William Fitts Carlson
Wellesley	Pine Manor Junior College	Mrs. Marie W. Potter

Michigan

Bay City	Bay City Junior College	George E. Butterfield Dean
Flint	Flint Junior College	W. S. Shattuck, Dean
Grand Rapids	Catholic Junior College	Arthur F. Bukowski
Grand Rapids	Grand Rapids Junior College	Arthur Andrews
Highland Park	Highland Park Junior College	George I. Altenburg, Dean
Ironwood	Gogebic Junior College	R. Ernest Dear, Dean
Jackson	Jackson Junior College	H. A. Steele
Muskegon	Muskegon Junior College	A. G. Umbreit
Port Huron	Port Huron Junior College	John H. McKenzie
Spring Arbor	Spring Arbor Seminary & Junior College	LeRoy M. Lowell

Minnesota

Coleraine	Itasca Junior College	Joseph B. Davis, Dean
Duluth	Duluth Junior College	R. D. Chadwick, Dean
Ely	Ely Junior College	Sigurd F. Olson
Eveleth	Eveleth Junior College	O. H. Gibson
Hibbing	Hibbing Junior College	H. A. Drescher
Rochester	Rochester Junior College	R. W. Goddard
St. Paul	Concordia College	Martin Graebner
Virginia	Virginia Junior College	Floyd B. Moe, Dean

Mississippi

Brookhaven	Whitworth College	Sinclair Daniel
Clinton	Hillman College	M. P. L. Berry
Decatur	East Central Junior College	L. O. Todd
Ellisville	Jones County Junior College	M. P. Bush
Goodman	Holmes Junior College	M. C. McDaniel
Gulfport	Gulf Park College	Richard G. Cox
Mathiston	Wood Junior College	Edward Seay
Moorhead	Sunflower Junior College	Paul M. West
Newton	Clarke Memorial College	W. L. McMullan
Perkinston	Harrison-Stone-Jackson Junior College	C. J. Darby
Poplarville	Pearl River Junior College	R. E. L. Sutherland
Raymond	Hinds Junior College	G. M. McLendon
Scooba	East Mississippi Junior College	J. M. Tubb

City	Institution	President
Senatobia	Northwest Mississippi Junior College	R. C. Pugh
Summit	Southwest Mississippi Junior College	J. M. Kenna
Vicksburg	All Saints' Episcopal College	W. G. Christien
Wesson	Copiah Lincoln Junior College	James M. Ewing

Missouri

Bolivar	Southwest Baptist College	Courts Redford
Columbia	Christian College	J. C. Miller
Columbia	Stephens College	James M. Wood
Conception	Conception Junior College	Stephen Schappler
Concordia	St. Paul's College	Albert J. C. Moeller
Flat River	Junior College of Flat River	Irvin F. Coyle, Dean
Fulton	William Woods College	H. G. Harmon
Hannibal	Hannibal-LaGrange Junior College	Andrew F. Morris
Iberia	Iberia Junior College	G. Byron Smith
Jefferson City	Jefferson City Junior College	G. J. Linker
Kansas City	Kansas City Junior College	A. M. Swanson
Kansas City	St. Teresa's Junior College	Sister Simplicia
Kansas City	Western Seminary	C. Richardson
Moberly	Moberly Junior College	M. A. Spohrer, Dean
Monett	Monett Junior College	H. D. McEachen
Nevada	Cottey Junior College for Women	Marjorie Mitchell
St. Joseph	St. Joseph Junior College	Nelle Blum, Dean
Trenton	Trenton Junior College	S. M. Rissler
Warrenton	Central Wesleyan College	C. A. Greene

Montana

Great Falls	Great Falls Junior College	J. A. Rooney
Havre	Northern Montana College	G. H. Vande Bogart

Nebraska

Hebron	Hebron College and Academy	K. F. Weltner
McCook	McCook Junior College	F. L. Holmes
Scottsbluff	Scottsbluff Junior College	J. E. Shedd
Wahoo	Luther College	Paul M. Lindberg

New Hampshire

New London	Colby Junior College	H. Leslie Sawyer
Rye Beach	Stoneleigh College	Richard D. Currier

New Jersey

Hackettstown	Centenary Junior College	Robert J. Trevorrow
Long Branch	Monmouth Junior College	Edward G. Schlaefer, Dean
Morristown	Morris Junior College	Arthur S. Platt
Newark	Essex Junior College	Adolph M. Koch
Paterson	College of Paterson	Herbert S. Robinson
Perth Amboy	Middlesex Junior College	Ladd Lukats, Dean
Roselle	Union County Junior College	Charles G. Cole, Dean
Teaneck	Bergen Junior College	C. L. Littel

New Mexico

Portales	Eastern New Mexico College	Donald W. MacKay

New York

Briarcliff Manor	Briarcliff Junior College	Doris L. Flick
Cazenovia	Cazenovia Seminary and Junior College	Burritt C. Herrington
Bronxville	Concordia Collegiate Institute	Arthur J. Doege
Brooklyn	The Packer Collegiate Institute	Paul D. Shafer
Millbrook	The Bennett School and Bennett Junior College	Courtney Carroll
New York	Finch Junior College	Jessica G. Cosgrave
North Chili	A. M. Chesbrough Seminary	Merlin G. Smith

North Carolina

Asheville	Biltmore College	C. A. Lloyd, Dean
Banner Elk	Lees-McRae College	Edgar H. Tufts
Belmont	Belmont Abbey College	Vincent G. Taylor
Boiling Springs	Boiling Springs Junior Baptist College	John R. Cantrell
Brevard	Brevard College	Eugene J. Coltrane
Buies Creek	Campbell College	L. H. Campbell
Louisburg	Louisburg College	Walter Patten
Mars Hill	Mars Hill College	Hoyt Blackwell
Maxton	Presbyterian Junior College for Men	Louis C. La Motte
Misenheimer	Pfeiffer Junior College	W. S. Sharp
Montreat	Montreat College	R. C. Anderson
Murfreesboro	Chowan Junior College	J. L. Carrick
Raleigh	Peace Junior College	William C. Pressly
Raleigh	St. Mary's School & Junior College	Mrs. Ernest Cruikshank
Salemburg	Pineland College and Edwards Military Institute	W. J. Jones
Statesville	Mitchell College	Mrs. W. B. Ramsay
Wingate	Wingate Junior College	Craven Cullen Burris

North Dakota

Bottineau	North Dakota School of Forestry	A. F. Arnason
Wahpeton	North Dakota State School of Science	E. F. Riley

Ohio

Rio Grande	Rio Grande College	William A. Lewis
Urbana	Urbana Junior College	Russell Eaton
Van Wert	Giffin College	C. G. Giffin

Oklahoma

Altus	Altus Junior College	A. G. Steele
Bacone	Bacone Junior College	B. D. Weeks
Bartlesville	Bartlesville Senior High School and Junior College	Paul C. Norvell
Bristow	Bristow Junior College	E. H. Black
Claremore	Oklahoma Military Academy	Walter E. Downs
Hobart	Kiowa County Junior College	B. A. McElyea
Lawton	Cameron State Agricultural College	Charles M. Conwill
Miami	Northeastern Oklahoma Junior College	Sabin C. Percefull
Muskogee	Muskogee Junior College	Bessie M. Huff, Dean
Oklahoma City	Oklahoma City Junior College	A. H. Parmelee, Director
Okmulgee	Okmulgee Junior College	W. A. Rutledge, Dean
Sapulpa	Sapulpa Junior College	E. O. Shaw
Seminole	Seminole Junior College	John G. Mitchell
Tishomingo	Murray State School of Agriculture	Clive E. Murray
Tonkawa	University Preparatory School & Junior College	Loren N. Brown
Tulsa	Monte Cassino Junior College	Sister M. Alexia Connors
Warner	Connors State Agricultural College	Jacob Johnson
Wetumka	Wetumka Junior College	G. S. Sanders
Wilburton	Eastern Oklahoma A. & M. College	C. C. Dunlap
Woodward	Woodward Junior College	R. R. Russell

Oregon

Portland	Multnomah College	Edward L. Clark

Pennsylvania

Bryn Mawr	Harcum Junior College	Mrs. Edith H. Harcum
Cambridge Springs	Alliance College	John J. Kolasa
Chambersburg	Penn Hall Junior College & Preparatory School	Frank S. Magill
La Plume	Scranton-Keystone Junior College	Byron S. Hollinshead
Lititz	Linden Hall Junior College	F. W. Stengel
Rydal	Ogontz Junior College and Ogontz School	Abby A. Sutherland
Swarthmore	Wildcliff Junior College	H. M. Crist
Williamsport	Williamsport Dickinson Seminary and Junior College	John W. Long
Wyomissing	Wyomissing Polytechnic Institute	Arthur C. Harper

South Carolina

Anderson	Anderson College	Annie D. Denmark
Central	Wesleyan Methodist College	John F. Childs
Rock Hill	Friendship Junior College	A. B. Williams, Acting Dean
Seneca	Seneca Junior College	J. D. Bryan
Spartanburg	Textile Institute	R. B. Burgess

City	Institution	President
South Dakota		
Freeman	Freeman Junior College	John D. Unruh
Mitchell	Notre Dame Junior College	J. M. Brady
Wessington Springs	Wessington Springs Junior College	W. A. Harden
Yankton	Mt. Marty Junior College	Mother M. Jerome
Tennessee		
Athens	Tennessee Wesleyan College	James L. Robb
Collegedale	Southern Junior College	J. C. Thompson
Henderson	Freed-Hardeman College	N. B. Hardeman
Madisonville	Hiwassee College	T. A. Frick
Nashville	David Lipscomb College	E. H. Ijams
Nashville	Trevecca Nazarene College	A. B. Mackey
Nashville	Ward-Belmont School	Joseph E. Burk
Pulaski	Martin College	Keener L. Rudolph
Rogersville	Swift Memorial Junior College	W. C. Hargrave
Texas		
Amarillo	Amarillo College	J. F. Mead
Arlington	North Texas Agricultural College	E. E. Davis, Dean
Beaumont	Lamar College	C. W. Bingman
Brenham	Blinn College	Charles F. Schmidt
Brownsville	Brownsville Junior College	E. C. Dodd
Clarendon	Clarendon Junior College	H. T. Burton
Clifton	Clifton Junior College	C. Tyssen
Corpus Christi	Corpus Christi Junior College	R. B. Fisher
Decatur	Decatur Baptist College	J. L. Ward
Edinburg	Edinburg Junior College	R. P. Ward
Fort Worth	Our Lady of Victory College	Sister M. Albertine
Gainesville	Gainesville Junior College	H. O. McCain
Goose Creek	Lee Junior College	Harmon Lowman
Hillsboro	Hillsboro Junior College	L. W. Hartsfield
Houston	University of Houston	E. E. Oberholtzer
Jacksonville	Jacksonville College	J. W. Overall
Jacksonville	Lon Morris College	C. E. Peeples
Keene	Southwestern Junior College	H. H. Hamilton
Kerrville	Schreiner Institute	J. J. Delaney
Kilgore	Kilgore College	B. E. Masters, Dean
Marshall	College of Marshall	F. S. Groner
Paris	Paris Junior College	J. R. McLemore
Plainview	Wayland Junior College	G. W. McDonald
Ranger	Ranger Junior College	William T. Walton
San Angelo	San Angelo College	Wilson H. Elkins
San Antonio	San Antonio Junior College	J. E. Nelson, Director
Seguin	Texas Lutheran College	Wm. F. Kraushaar
Stephenville	John Tarleton Agricultural College	J. Thomas Davis, Dean
Tehuacana	Westminster College	Clarence A. Sutton
Temple	Temple Junior College	Joe R. Humphrey
Terrell	Texas Military College	Mrs. Louis C. Perry
Texarkana	Texarkana Junior College	H. W. Stilwell
Tyler	Tyler Junior College	J. M. Hodges
Victoria	Victoria Junior College	P. S. Garner
Weatherford	Weatherford College	G. C. Boswell
Wichita Falls	Hardin Junior College	H. D. Fillers
Utah		
Ephraim	Snow College	James A. Nuttall
Ogden	Weber College	H. A. Dixon
St. George	Dixie Junior College	Glenn E. Snow
Salt Lake City	Westminster College	Robert D. Steele
Vermont		
Montpelier	Vermont Junior College	John H. Kingsley
Poultney	Green Mountain Junior College	Jesse P. Bogue
Virginia		
Blackstone	Blackstone College for Girls	J. Paul Glick
Bluefield	Bluefield College	Edwin C. Wade
Bristol	Sullins College	W. E. Martin
Bristol	Virginia Intermont College	H. G. Noffsinger
Buena Vista	Southern Seminary & Junior College	Robert Lee Durham
Danville	Averett College	Curtis Bishop
Danville	Stratford College	John C. Simpson
Dayton	Shenandoah College	Wade S. Miller
Ferrum	Ferrum Junior College	J. A. Chapman
Harrisonburg	Eastern Mennonite School	John L. Stauffer
Marion	Marion College	Hugh J. Rhyne
Petersburg	Southern College	Arthur K. Davis
Waynesboro	Fairfax Hall Junior College	W. B. Gates
Washington		
Aberdeen	Grays Harbor Junior College	Lewis C. Tidball
Centralia	Centralia Junior College	Margaret Corbet
Lacey	St. Martin's College	Lambert Burton
Longview	Lower Columbia Junior College	David L. Soltau
Mount Vernon	Mount Vernon Junior College	Charles H. Lewis
Parkland	Pacific Lutheran College	O. A. Tingelstad
Spokane	Spokane Junior College	G. H. Schlauch
Yakima	Yakima Valley Junior College	Elizabeth A. Prior
West Virginia		
Beckley	Beckley College	J. Lewis Baumgardner
Charleston	Kanawha College	L. S. McDaniel
Keyser	Potomac State School	E. E. Church
Lewisburg	Greenbrier College	French W. Thompson
Wisconsin		
Madison	Edgewood Junior College of the Sacred Heart	Sister Marie Aileen
Milwaukee	Concordia College	Leroy C. Rincker
Mt. Calvary	St. Lawrence Junior College	Theodosius Foley
St. Nazianz	Salvatorian Seminary	S. Freischmidt
Canal Zone		
Balboa	Canal Zone Junior College	Fred W. Hosler, Dean
Canada		
Calgary, Alta.	Mount Royal Junior College	George W. Kerby

SECTION XV
HEADS OF PRIVATE SCHOOLS

City	Institution	Head
Alabama		
Fairhope	School of Organic Education	S. W. Alexander
Mobile	University Military School	William S. Pape
Thorsby	Thorsby Institute	Helen C. Jenkins
California		
Berkeley	Anna Head School	T. R. Hyde
Beverly Hills	Berkeley Hall School	Mary E. Stevens
Claremont	Webb School of California	Thompson Webb
Culver City	Pacific Military Academy	Leon C. High
La Jolla	The Bishop's School	Caroline S. Cummins
Los Angeles	Cumnock School	Raymond C. Brooks
Los Angeles	Marlborough School for Girls	Ada S. Blake
Los Angeles	Urban Academy, Inc.	P. G. McDonnell
Los Angeles	Westlake School for Girls	Frederica de Laguna
Los Gatos	Montezuma School for Boys	Howard R. Porter
Menlo Park	Menlo School and Junior College	Lowry S. Howard
North Hollywood	Harvard School	Robert B. Gooden
Pacific Beach	Brown Military Academy	Charles Bain
Palo Alto	Castilleja School	Miriam S. Converse
Palo Alto	Miss Harker's School	Sara D. Harker
Pasadena	Westridge School for Girls	Anne F. Parker
San Francisco	Miss Burke's School	Barbara Burke
San Francisco	Drew School	John S. Drew
San Francisco	Sarah Dix Hamlin School	Mrs. E. B. Stanwood
San Rafael	San Rafael Military Academy	A. L. Stewart
San Rafael	The Tamalpais School	Frederick J. Daly
Colorado		
Colorado Springs	Fountain Valley School	Francis Mitchell Froelicher
Denver	Kent School for Girls	Mary A. Bogue
Connecticut		
Avon	Avon Old Farms	Percy G. Kammerer
Bloomfield	St. Thomas Seminary	Henry J. O'Brien
Cheshire	Cheshire Academy	Arthur N. Sheriff
Clinton	Morgan School	George L. Scott
Farmington	Miss Porter's School	Robert Porter Keep
Greenwich	Brunswick School	William L. Henry
Greenwich	The Edgewood School	Euphrosyne E. Langley
Greenwich	Greenwich Academy	Ruth West Campbell
Greenwich	Rosemary Hall	Mrs. R. R. Evers, Mrs. H. H. Jessup
Hartford	Oxford School	Mrs. Elizabeth Conner Lindsay
Kent	Kent School	Frederick H. Sill
Lakeville	Hotchkiss School	George Van Santvoord
Middlebury	Westover School	Louise B. Dillingham
Milford	The Milford School	William D. Pearson
New Haven	Collegiate School	Arthur Pite
New Haven	The Day School	Julia B. Thomas
New Haven	Hamden Hall Country Day School	E. Stanley Taylor
New Haven	Hopkins Grammar School	George B. Lovell
New London	Bulkeley School	Homer K. Underwood
New Milford	Canterbury School	Nelson Hume
Norwich	Norwich Free Academy	Henry A. Tirrell
Pomfret	Pomfret School	Halleck Lefferts
Rowayton	The Thomas School	Mabel Thomas
Salisbury	Salisbury School	Emerson B. Quaile
Simsbury	Ethel Walker School	Mrs. Elliott Speer
Simsbury	Westminster School	Arthur Milliken
South Kent	South Kent School	Samuel S. Bartlett
Stamford	The King School	V. A. Dwelle
Stamford	Low-Heywood School	Mary R. Roper
Suffield	Suffield Academy	John F. Schereschewsky
Wallingford	The Choate School	George C. St. John
Washington	The Gunnery School	Tertius van Dyke
Washington	Wykeham Rise School	Elsie Lanier
Waterbury	St. Margaret's School	Alberta C. Edell
Watertown	The Taft School	Paul F. Cruikshank
West Hartford	Kingswood School	G. R. H. Nicholson
Windsor	The Loomis School	N. H. Batchelder
Winsted	The Gilbert School	Henry S. Moseley
Delaware		
Middletown	St. Andrew's School	Walden Pell 2nd
Wilmington	Friends School	Wilmot R. Jones
Wilmington	Tower Hill School	Burton P. Fowler
District of Columbia		
Washington	Academy of the Holy Cross	Sister M. Rose Elizabeth
Washington	Devitt School	J. F. Byerly
Washington	Emerson Institute	John J. Humphrey
Washington	Georgetown Visitation Convent	Sister Margaret Mary Sheerin
Washington	Gunston Hall	Mary L. Gildersleeve
Washington	Holton-Arms School & Junior College	Mrs. Jessie M. Holton
Washington	Immaculata Seminary	Sister Mary Genevieve
Washington	National Cathedral School	Mabel B. Turner
Washington	St. Albans	Albert H. Lucas
Washington	Sidwell Friends School	Albert E. Rogers
Florida		
Jacksonville	The Bolles School	Roger M. Painter
Miami	Miss Harris' School	Julia F. Harris
Miami Beach	Coburn Country Day School	Nelson Coburn
Orlando	Cathedral School for Girls	Mrs. Louise C. Massey
Palm Beach	Palm Beach Private School	Karl B. Dearborn
St. Leo	St. Leo College Prep School	Francis Sadlier
St. Petersburg	Aikin Open Air School	Mrs. Maude Aikin
St. Petersburg	Florida Military Academy	W. B. Mendels
Georgia		
Atlanta	North Avenue Presbyterian School	Thyrza S. Askew
Atlanta	Peacock School for Boys	J. H. Peacock
Atlanta	University School for Boys	W. E. Dendy
Atlanta	Washington Seminary	Emma B. Scott
College Park	Georgia Military Academy	J. C. Woodward
Gainesville	Riverside Military Academy	Sandy Beaver
Oxford	Emory at Oxford	George S. Roach
Rome	Darlington School	C. R. Wilcox
Savannah	Pape School	Nina A. Pape
Illinois		
Aledo	Roosevelt Military Academy	Karl J. Stouffer
Alton	Western Military Academy	C. L. Persing
Chicago	Chicago Latin School	James O. Wood
Chicago	Faulkner School for Girls	Elizabeth Faulkner
Chicago	The Girls Latin School of Chicago	Elizabeth Singleton
Chicago	Harvard School for Boys	Elsie Schobinger, Charles E. Pence
Chicago	Loring School	Cecilia Russell
Chicago	Luther Institute	John C. Anderson
Chicago	Morgan Park Military Academy	Hugh G. Price
Chicago	Francis W. Parker School	Herbert W. Smith
Chicago	Starrett School for Girls	Gerard T. Smith
Chicago	Stickney School	Stanley M. Durrant
Chicago	University High School	P. B. Jacobson
Elgin	Elgin Academy	Earl G. Leinbach
Evanston	Marywood School for Girls	Sister Carita
Evanston	Roycemore School	Rebecca S. Ashley
La Grange	Broadview Academy	A. J. Olson
Lake Forest	Ferry Hall	Eloise R. Tremain
Lake Forest	Lake Forest Academy	John W. Richards
Mooseheart	Mooseheart School	W. J. Leinweber
Onarga	Onarga Military School	J. E. Bittinger, Supt.

City	Institution	Head
Rock Island	Villa De Chantal	Sister Marie
Winnetka	The North Shore Country Day School	Perry D. Smith

Indiana

Culver	Culver Military Academy	W. E. Gregory, Acting
Howe	Howe School	Burrett B. Bouton
Indianapolis	Tudor Hall School	I. Hilda Stewart

Iowa

Dubuque	Loras Academy	N. C. Barrett

Kansas

Salina	St. John's Military School	R. L. Clem, Supt.

Kentucky

Lexington	Sayre School for Girls	J. C Hanley
Louisville	Kentucky Home School for Girls,	Annie S. Anderson, Annie S. Waters
Louisville	Louisville Collegiate Institute	Dorothy Graff
Lyndon	Kentucky Military Institute	N. C. Hodgin
Millersburg	Millersburg Military Institute	W. R. Nelson
Shelbyville	Science Hill School	Juliet J. Poynter

Louisiana

New Orleans	Gilbert Academy	Margaret Davis Bowen
New Orleans	Louise S. McGehee School	Nina P. Davis
New Orleans	Metairie Park Country Day School	Ralph E. Boothby
New Orleans	Isidore Newman School	C. C. Henson

Maine

Bethel	Gould Academy	Philip S. Sayles
Charleston	Higgins Classical Institute	Wm. A. Tracy
Dover-Foxcroft	Foxcroft Academy	C. E. Wood
Fryeburg	Fryeburg Academy	Elroy O. LaCasce
Hebron	Hebron Academy	Ralph L. Hunt
Houlton	Ricker Classical Institute & Junior College	R. M. Hayes
Kents Hill	Kents Hill School	Edward W. Hincks
North Bridgton	Bridgton Academy	H. H. Sampson
Pittsfield	Maine Central Institute	Edwin M. Purinton
Portland	The Waynflete School	Barbara B. Woodruff
Saco	Thornton Academy	Hollis A. Sanderson
South Berwick	Berwick Academy	Ercell M. Gordon
Vassalboro	Oak Grove School	Robert E. Owen
Waterville	Coburn Classical Institute	Hugh A. Smith

Maryland

Baltimore	Boys' Latin School	Frederick A. Hahn
Baltimore	Bryn Mawr School	Katherine Van Bibber
Baltimore	Friends School	Edwin C. Zavitz
Baltimore	Gilman Country School	E. Boyd Morrow
Baltimore	Girls' Latin School	Lillian M. Kloppel
Baltimore	Loyola High School	John J. Long
Baltimore	Mount St. Agnes School	Sister Mary Kathleen
Baltimore	Notre Dame of Maryland School	Sister Mary Coeline
Baltimore	The Park School	Hans Froelicher, Jr.
Baltimore	Roland Park Country School	Elizabeth M. Castle
Catonsville	St. Timothy's School	Ella R. Watkins
Charlotte Hall	Charlotte Hall School	M. D. Burgee
Forest Glen	National Park College	Roy Tasco Davis
Garrett Park	Georgetown Preparatory School	Robert P. Arthur
Garrison	Garrison Forest School	Jean G. Marshall
Glencoe	Oldfields School, Inc.	Duncan McCulloch
McDonogh	McDonogh School	Louis E. Lamborn
Port Deposit	The Tome School	Trentwell Mason White
Reisterstown	The Hannah More Academy	Laura Fowler
Ruxton	Greenwood School	Mary A. Elcock
St. James	St. James School	James B. Drake
Severna Park	Severn School	Rolland M. Teel

City	Institution	Head

Massachusetts

Andover	Abbot Academy	Marguerite Hearsey
Andover	Phillips Academy	Claude Moore Fuess
Ashburnham	Cushing Academy	Clarence P. Quimby
Belmont	Belmont Hill School	Thomas R. Morse
Boston	Boston Academy of Notre Dame	Sister Teresa
Boston	The Brimmer School	Mabel H. Cummings
Boston	Chauncy Hall School	Franklin T. Kurt
Boston	Erskine School	Edith A. Richardson
Boston	Huntington School for Boys	Charles H. Sampson
Boston	The May School	Mrs. Chas. H. Haskins
Boston	The Winsor School	Frances Dorwin Dugan
Brookline	Choate School	Augusta Choate
Brookline	The Rivers School	Clarence E. Allen
Cambridge	The Browne & Nichols School	Geoffrey W. Lewis
Cambridge	The Buckingham School	Marian W. Vaillant
Cambridge	Manter Hall School	J. C. Hall
Cambridge	New Preparatory School	Ernest Benshimol
Chestnut Hill	The Beaver Country Day School	Eugene R. Smith
Concord	Concord Academy	Valeria A. Knapp
Concord	Middlesex School	Lawrence Terry
Danvers	St. John's Preparatory School	Brother Aubert
Dedham	Noble & Greenough School	Charles Wiggins
Deerfield	Deerfield Academy	Frank L. Boyden
Easthampton	Williston Academy	Archibald V. Galbraith
East Northfield	Northfield Seminary	Mira B. Wilson
Franklin	Dean Academy	Earle S. Wallace
Groton	Groton School	Endicott Peabody
Groton	Lawrence Academy	Fred Clifton Gray
Hingham	Derby Academy	H. M. Davis, Jr.
Kendall Green	The Cambridge School, Inc.	John R. D. French
Lowell	Rogers Hall	Mrs. Katharine W. McGay
Marion	Tabor Academy	Walter H. Lillard
Milton	Milton Academy	Wm. L. W. Field
Mt. Hermon	Mount Hermon School	David R. Porter
Natick	Walnut Hill School	Hester R. Davies
Newton	The Country Day School for Boys	W. Linwood Chase
North Andover	Brooks School	Frank D. Ashburn
Norton	House in the Pines	Mrs. G. C. Milliken
Pittsfield	Miss Hall's School	Margaret H. Hall
Sheffield	Berkshire School	Seaver B. Buck
Southborough	St. Mark's School	Francis Parkman
South Braintree	Thayer Academy	Stacy B. Southworth
South Byfield	Governor Dummer Academy	Edward W. Eames
Springfield	The MacDuffie School	M. A. MacDuffie
Wellesley	Academy of the Assumption	Sister Maris Stella
Wellesley	Dana Hall Schools	Helen Temple Cooke
West Bridgewater	Howard Seminary	Macdonald Peters
Weston	The Cambridge School	John R. P. French
West Roxbury	Roxbury Latin School	George N. Northrop
Wilbraham	Wilbraham Academy	Charles L. Stevens
Worcester	Bancroft School	Bradford M. Kingman
Worcester	Worcester Academy	Harold H. Wade

Michigan

Bloomfield Hills	Cranbrook School	R. D. Lindquist
Bloomfield Hills	Kingswood School Cranbrook	Margaret A. Augur
Grosse Pointe Woods	Detroit University School	C. O. Page
Detroit	The Liggett School	Katharine Ogden
Detroit	Miss Newman's School	Mary Newman

Minnesota

Duluth	Stanbrook Hall	Sister M. Raymond
Faribault	St. Mary's Hall	Margaret Robertson
Faribault	Shattuck School	James S. Guernsey
Minneapolis	The Blake School	Eugene C. Alder
Minneapolis	Minnehaha Academy	E. O. Franklin
Minneapolis	Northrop Collegiate School	Ethel M. Spurr
Owatonna	Pillsbury Academy	G. R. Strayer
St. Paul	Oak Hall	Royal A. Moore
St. Paul	St. Paul Academy	John DeQ. Briggs
St. Paul	The Summit School	Sarah Converse

Mississippi

Blue Mountain	Mississippi Heights Academy	J. E. Brown
Gulfport	Gulf Coast Military Academy	Nat Owen
Port Gibson	Chamberlain-Hunt Academy	J. W. Kennedy

City	Institution	Head
Missouri		
Boonville	Kemper Military School	A. M. Hitch
Clayton	John Burroughs School	Leonard D. Haertter
Clayton	Chaminade College Academy	Valentine B. Braun
Columbia	University High School	L. G. Townsend
Kansas City	Barstow School	Winifred H. Turner
Kansas City	Pembroke-Country Day School	Howard E. A. Jones
Kansas City	Sunset Hill School	Mrs. Orville C. Green
Lexington	Wentworth Military Academy	R. C. Ford
Mexico	Missouri Military Academy	Marquess Wallace
Point Lookout	The School of the Ozarks	R. M. Good
St. Louis	Mary Institute	Charles H. Garrison
St. Louis	The Principia	Frederic E. Morgan
St. Louis	St. Louis Country Day School	Robert H. B. Thompson
Nebraska		
Omaha	Brownell Hall	Marguerite H. Wickenden
Omaha	Pratt School of Individual Instruction	Mrs. C. F. Pratt
New Hampshire		
Andover	Proctor Academy	J. Halsey Gulick
Center Strafford	Austin-Cate Academy	Clarence Cummings
Concord	St. Paul's School	Norman B. Nash
Derry	Pinkerton Academy	John H. Bell
Exeter	Phillips Exeter Academy	Lewis Perry
Exeter	Robinson Seminary	James A. Pirnie
Kingston	Sanborn Seminary	Raymond A. Hoyt
Meriden	Kimball Union Academy	William R. Brewster
New Hampton	New Hampton	Frederick Smith
Tilton	Tilton School and Junior College	James E. Coons
Wolfeboro	Brewster Free Academy	Walter G. Grennall, Jr.
New Jersey		
Blairstown	Blair Academy	Charles H. Breed
Bordentown	Bordentown Military Institute	H. M. Smith, J. H. Lucas, & D. Styer
Burlington	St. Mary's Hall	Edith M. Weller
Convent	Academy of St. Elizabeth	Sister Marie Josephine
Elizabeth	Pingry School	E. Laurence Springer
Elizabeth	The Vail-Deane School	Eleanor Denison
Englewood	Dwight School	Frances Leggett, Mrs. Charles W. Hulst
Essex Falls	Kingsley School	Paul C. McPherson
Gladstone	St. Bernard's School	H. D. Nicholls
Hightstown	Peddie School	Wilbour E. Saunders
Hoboken	Stevens Hoboken Academy	B. F. Carter
Jersey City	Bergen School for Girls	Louise W. Moora
Lakewood	Newman School	William M. Agar
Lawrenceville	The Lawrenceville School	Allan V. Heely
Montclair	The Kimberley School	Mary K. Waring, Mary A. Jordan
Montclair	Montclair Academy	Walter D. Head
Moorestown	Moorestown Friends School	Chester L. Reagan
Morristown	Morristown School	James H. S. Fair
Newark	Newark Academy	Clinton F. Zerweck
Newark	Newark Preparatory School	Leon Terry
Newark	Prospect Hill Country Day School	Albert A. Hamblen
New Brunswick	Rutgers Preparatory School	Stanley Shepard, Jr.
Orange	Miss Beard's School	Lucie C. Beard
Pennington	Pennington School	Francis Harvey Green
Pine Beach	Admiral Farragut Academy	S. S. Robinson, Supt.
Plainfield	The Hartridge School	Emelyn B. Hartridge
Plainfield	Wardlaw School	C. D. Wardlaw
Princeton	Miss Fine's School	Katherine B. Shippen
Princeton	Hun School	John G. Hun
Summit	Kent Place School	Harriet L. Hunt
West Orange	Carteret School	George G. Grim
New Mexico		
Roswell	New Mexico Military Institute	D. C. Pearson
New York		
Albany	Academy of the Holy Names	Sister M. Judith
Albany	The Albany Academy	Islay F. McCormick
Albany	Albany Academy for Girls	Margaret Trotter
Albany	St. Agnes School	Blanche Pittman
Bronxville	Brantwood Hall	Winnifred Brown
Brooklyn	Adelphi Academy	William Slater
Brooklyn	Berkeley Institute	Ina C. Atwood
Brooklyn	Brooklyn Academy	Chas. W. Cortright
Brooklyn	Brooklyn Friends School	Douglas G. Grafflin
Brooklyn	Brooklyn Preparatory School	John H. Klocke
Brooklyn	Colby Academy	Walter S. Meyer
Brooklyn	Polytechnic Preparatory Country Day School	Joseph Dana Allen
Brooklyn	Shore Road Academy	Theodora Goldsmith, Helen E. Reddig
Buffalo	The Buffalo Seminary	L. Gertrude Angell
Buffalo	The Franklin School	Janet Crawford
Buffalo	Nichols School	Philip M. B. Boocock
Carmel	Drew Seminary for Young Women	Herbert E. Wright
Cooperstown	Knox School	Mrs. E. Russell Houghton
Cornwall	New York Military Academy	Frank A. Patillo
Dobbs Ferry	The Masters School	Evelina Pierce
Flushing	The Foxwood School	Mrs. Elizabeth C. Dresser
Forest Hills	Kew-Forest School	Louis D. Marriott
Garden City	Cathedral School of St. Mary	Marion B. Reid
Garden City	St. Paul's School	Walter R. Marsh
Jackson Heights	Garden Country Day School	O. P. Flower
Lake Placid Club	Northwood School	Ira A. Flinner
Lakemont	Palmer Institute-Starkey Seminary	James P. Long
Lima	Genesee Wesleyan Seminary	C. C. Edgett
Locust Valley	Friends Academy	Harold A. Nomer
Manlius	The Manlius School	Guido F. Verbeck
Montour Falls	Cook Academy	William S. Fisher
New Hartford	Utica Country Day School	Raymond B. Johnson
New York	Academy Mount Saint Vincent	Sister Mary Angelica
New York	All Hallows Institute	P. A. Gleeson
New York	The Barnard School for Boys	William L. Hazen
New York	The Barnard School for Girls	Margaret D. Gillette
New York	Bentley School	Bertha M. Bentley
New York	The Berkeley-Irving School	Louis C. Woodruff
New York	Birch Wathen School	Louise Birch, Edith Wathen
New York	The Brearley School	Mrs. Rustin McIntosh
New York	The Calhoun School	Mary E. Calhoun, Ella C. Levis
New York	The Chapin School, Ltd.	Ethel G. Stringfellow
New York	Collegiate School	Wilson Parkhill
New York	Columbia Grammar School	Frederic A. Alden
New York	The Dalton Schools, Inc.	Helen Parkhurst
New York	Ethical Culture Schools	V. T. Thayer
New York	Franklin School	David P. Berenberg, Clifford W. Hall
New York	Friends Seminary	S. Archibald Smith
New York	The Gardner School	M. Elizabeth Masland
New York	The Lenox School	Olivia Green
New York	Lincoln School of Teachers College	Lester Dix
New York	Horace Mann School	Rollo G. Reynolds
New York	Horace Mann School for Boys	Charles C. Tillinghast
New York	McBurney School	Thomas Hemenway
New York	New York Preparatory School	Ernest Greenwood
New York	Rhodes School	David Goodman
New York	The Riverside School	Margaret E. Wells
New York	St. Agatha	Muriel Bowden
New York	St. Ann's Academy	Brother Marcel Henry
New York	Scudder School	James E. Lough
New York	The Spence School	Mrs. Harold S. Osborne
New York	Trinity School	Matthew M. E. Dann
New York	Walden School	Hannah Falk
Niagara Falls	DeVeaux School	George L. Barton, Jr.
Oakdale	La Salle Military Academy	Brother Ambrose
Pawling	Pawling School	R. J. Shortlidge
Peekskill	Peekskill Military Academy	John C. Bucher
Peekskill	St. Mary's School	Sister Mary Regina
Poughkeepsie	Oakwood School	William J. Reagan
Riverdale	Riverdale Country School	Frank S. Hackett
Rochester	Allendale School	John R. Webster
Rochester	Columbia School	Mrs. Della E. Simpson
Rochester	The Harley School	Louise M. Sumner
Rye	Rye Country Day School	Morton Snyder
Scarborough	Scarborough School	F. Dean McClusky
Schenectady	The Brown School	Amy Kermeth
Snyder	The Park School of Buffalo	M. Adolphus Cheek, Jr.
Staten Island	Notre Dame Academy	Mother St. Catharine of the Angels
Staten Island	Staten Island Academy	Stephen J. Botsford
Stony Brook	The Stony Brook School	Frank E. Gaebelein
Syracuse	Goodyear-Burlingame School	Marion S. Edwards, Edith Northrup
Tarrytown	The Hackley School	Madison Grant, Acting
Tarrytown	Highland Manor School	Eugene H. Lehman
Tarrytown	Irving School	C. W. Olson
Tarrytown	Marymount School	Mother St. Clare
Troy	Emma Willard School	Eliza Kellas
Troy	La Salle Institute	Brother Raymond
Woodmere	Woodmere Academy	Horace M. Perry

City	Institution	Head
North Carolina		
Asheville	Asheville School	David R. Fall
Asheville	St. Genevieve-of-the-Pines	Mother Lorin
Beaufort	St. Paul's School	
Buie's Creek	Campbell College & Academy	L. H. Campbell
Hendersonville	Fassifern School	Joseph R. Sevier
Oak Ridge	Oak Ridge Military Institute	T. O. Wright
Star	Country Life Academy	E. F. Green
Winston Salem	Salem Academy	Mary A. Weaver
North Dakota		
Fargo	Oak Grove Seminary	T. H. Quanbeck
Ohio		
Akron	Old Trail School	Eugene M. Hinton
Barnesville	Friends Boarding School	Blanche E. Schofield
Cincinnati	College Preparatory School	Ruth R. Jones
Cincinnati	Hillsdale	Miss Florence E. Fessenden
Cincinnati	University School	C. L. S. Easton
Cleveland	Hathaway-Brown School	Anne Cutter Coburn
Cleveland	Laurel School	Edna F. Lake
Columbus	The Columbus Academy	Frank P. R. Van Syckel
Columbus	The Columbus School for Girls	Samuel Shellabarger
Hudson	Western Reserve Academy	Joel B. Hayden
Maumee	Maumee Valley Country Day School	Willis W. Stork
Mt. St. Joseph	Mt. St. Joseph Academy	Sister Dorothea
Mt. Vernon	Mt. Vernon Academy	V. P. Lovell
Reading	Mount Notre Dame Academy	Sister Eleanor Josephine
Shaker Heights	University School	Harry A. Peters
Oregon		
Gaston	Laurelwood Academy	G. H. Simpson
Portland	The Catlin School	Ruth Catlin
Portland	Hill Military Academy	Joseph A. Hill
Portland	St. Helen's Hall	Sister Superior
Pennsylvania		
Ardmore	The Holman School	Elizabeth W. Braley
Birmingham	The Grier School	Thomas C. Grier
Bryn Mawr	The Baldwin School	Elizabeth F. Johnson
Bryn Mawr	The Shipley School	Alice G. Howland
Chestnut Hill	Chestnut Hill Academy	Charles Platt, Jr.
Forty Fort	The Wilkes-Barre Day School	Oscar N. Barber
George School	George School	George A. Walton
Harrisburg	Harrisburg Academy	Arthur E. Brown
Haverford	Haverford School	Cornelius B. Boocock
Hollidaysburg	Highland Hall	Elizabeth G. Baldwin
Kingston	Wyoming Seminary	Wilbur H. Fleck
Lancaster	Franklin & Marshall Academy	E. M. Hartman
Lancaster	The Shippen School	Eleanor Fitzpatrick
Latrobe	St. Xavier Academy	Sister M. Fabian
Mercersburg	The Mercersburg Academy	Boyd Edwards
New Bloomfield	Carson Long Institute	Edward L. Holman
Overbrook	The Episcopal Academy	Greville G. Haslam
Overbrook	Friends Central School	Barclay L. Jones
Pennsburg	Perkiomen School	Clarence E. Tobias, Jr.
Philadelphia	Academy of the Sacred Heart	Mother H. Moclair
Philadelphia	Brown Preparatory School	A. Linn Myers, Howard H. Prouse
Philadelphia	Carson College for Orphan Girls	Elsa Ueland
Philadelphia	Convent of the Sacred Heart	Mother M. Helen Lucas
Philadelphia	Friends' Select School	Walter W. Haviland
Philadelphia	Germantown Academy	Samuel E. Osbourn
Philadelphia	Germantown Friends School	Stanley R. Yarnall
Philadelphia	The Lankenau School for Girls	E. F. Bachmann
Philadelphia	Mount St. Joseph Academy	Mother M. St. Ursula
Philadelphia	Oak Lane Country Day School	George H. Ivins
Philadelphia	The William Penn Charter School	Richard Knowles
Philadelphia	Springside School	Mrs. Samuel H. Paul
Philadelphia	Stevens School	Helen L. Church
Philadelphia	Temple University High School	Charles E. Metzger
Pittsburgh	Arnold School	Roger B. Merriman, Jr.
Pittsburgh	The Ellis School	Sara Frazer Ellis
Pittsburgh	Shady Side Academy	E. Trudeau Thomas
Pittsburgh	The University School	Guy H. Baskerville
Pittsburgh	The Winchester-Thurston School	Mary A. G. Mitchell
Pottstown	The Hill School	James I. Wendell
Saltsburg	Kiskiminetas Springs School	John J. Daub
Susquehanna	Laurel Hill Academy	James A. Walsh
Swarthmore	The Mary Lyon School, Inc.	Haldy M. Crist
Washington	Washington Seminary	Jane C. Maxfield
Wayne	Valley Forge Military Academy	Milton G. Baker
Westtown	Westtown School	James F. Walker
Wynnewood	The Agnes Irwin School	Bertha M. Laws
York	York Collegiate Institute	Lester F. Johnson
Rhode Island		
East Greenwich	East Greenwich Academy	Maurice E. Barrett
Newport	St. George's School	J. Vaughan Merrick
Portsmouth	Portsmouth Priory School	J. Hugh Diman
Providence	Lincoln School	Marion S. Cole, Amy L. Philips
Providence	The Mary C. Wheeler School	Mary Helena Dey
Providence	The Moses Brown School	L. Ralston Thomas
South Carolina		
Aiken	Fermata School	Mrs. Scott Clark
Bamberg	Carlisle School	James F. Risher
Charleston	Ashley Hall	Mary V. McBee
Greenwood	Bailey Military Academy	James D. Fulp
Tennessee		
Baxter	Baxter Seminary	Harry L. Upperman
Bell Buckle	Webb School	W. R. Webb
Butler	Watauga Academy	C. A. Todd
Chattanooga	Baylor School	Herbert B. Barks
Chattanooga	Girls' Preparatory School	Tommie P. Duffy, Eida L. Jarnigan
Chattanooga	The McCallie School	S. J. & J. P. McCallie
Columbia	Columbia Military Academy	C. A. Ragsdale
Franklin	Battle Ground Academy	George I. Briggs
Lebanon	Castle Heights Military Academy	Harry L. Armstrong
Memphis	Miss Hutchison's School	Mary G. Hutchison
Nashville	Peabody Demonstration School	J. E. Windrow
Petersburg	The Morgan School	R. Kenneth Morgan, Jr.
Pleasant Hill	Pleasant Hill Academy	Victor Obenhaus
Sewanee	Sewanee Military Academy	C. A. Fasick
Sweetwater	Tennessee Military Institute	C. R. Endsley
Texas		
Bryan	Allen Academy	N. B. Allen
Dallas	Hockaday School for Girls	Ela Hockaday
Dallas	Terrill Preparatory School	S. M. Davis
El Paso	Radford School for Girls	Lucinda deL. Templin
Houston	Kinkaid School	Mrs. W. J. Kinkaid
Houston	St. Thomas College High School	A. L. Higgins
Laredo	Holding Institute	Anton Deschner
San Antonio	The Ruth Coit School	Estelle M. Bonnell
San Antonio	Peacock Military Academy	Wesley Peacock, Jr.
San Antonio	Texas Military Institute	W. W. Bondurant
San Marcos	San Marcos Academy	R. M. Cavness
Utah		
Salt Lake City	Rowland Hall	Wilfrida Messenger
Vermont		
Lyndon Center	Lyndon Institute	O. D. Mathewson
Manchester	Burr & Burton Seminary	Ralph E. Howes
Putney	The Putney School	Mrs. Sebastian Hinton
St. Johnsbury	St. Johnsbury Academy	Stanley R. Oldham
Saxtons River	Vermont Academy	Laurence G. Leavitt
Virginia		
Alexandria	Episcopal High School	A. R. Hoxton
Alexandria	St. Agnes School, Inc.	Helen Arny Macan
Chatham	Chatham Hall	Edmund J. Lee
Chatham	Hargrave Military Academy	Aubrey H. Camden
Danville	Danville Military Institute	Thomas Wilborn
Fork Union	Fork Union Military Academy	J. J. Wicker
Fort Defiance	Augusta Military Academy	Thos. J. Roller, Chas. S. Roller

City	Institution	Head
Front Royal	Randolph-Macon Academy	John C. Boggs
Greenway	The Madeira School	Lucy Madeira Wing
Lynchburg	Virginia Episcopal School	Oscar deW. Randolph
Middleburg	Foxcroft School	Charlotte H. Noland
Richmond	The Collegiate School for Girls	Mrs. Wm. T. Hodges
Richmond	McGuire's University School	John P. McGuire
Richmond	St. Catherine's School	Mrs. Jeffrey R. Brackett
Richmond	St. Christopher's School	R. W. Bugg, Acting
Staunton	Staunton Military Academy	J. Worth Pence
Staunton	Stuart Hall	Ophelia S. T. Carr
Warrenton	Warrenton Country School	Léa M. Bouligny
Waynesboro	Fishburne Military School	M. H. Hudgins
Woodberry Forest	Woodberry Forest School	J. Carter Walker
Woodstock	Massanutten Academy	Howard J. Benchoff

Washington

Seattle	Helen Bush School	Helen T. Bush
Seattle	Saint Nicholas School	Fanny C. Steele
Tacoma	Annie Wright Seminary	Elizabeth M. Fitch

West Virginia

Lewisburg	Greenbrier Military School	J. M. Moore

Wisconsin

Delafield	St. John's Military Academy	Roy F. Farrand
Kenosha	Kemper Hall	Mother Mary Ambrose
Lake Geneva	Northwestern Military & Naval Academy	R. P. Davidson
Milwaukee	Milwaukee Country Day School	A. Gledden Santer
Milwaukee	Milwaukee-Downer Seminary	Helen K. Burtt Mason
Milwaukee	Milwaukee University School	Frank S. Spigener
Prairie du Chien	Campion Jesuit High School	Albert J. Muntsch

Canada

Montreal, Que.	Lower Canada College	V. C. Wansbrough
Montreal, Que.	Mt. St. Louis College	Brother Anselme
Quebec, Que.	Ursuline College	M. S. Clotilde
Sackville, N. B.	Mt. Allison Academy and Commercial College	L. R. Glenn, Acting
Toronto, Ont.	Bishop Strachan School	E. M. Lowe
Toronto, Ont.	Branksome Hall	Edith M. Read
Toronto, Ont.	Havergal College	G. E. Millard
Toronto, Ont.	Loretto Abbey	
Toronto, Ont.	St. Joseph's College School	Sister Maura
Winnipeg, Man.	St. John's College School	W. Burman
Wolfville, N. S.	Horton Academy	E. W. Robinson

Cuba

Habana	Cathedral School	Mary C. Nichols

Hawaii

Honolulu	Kamehameha Schools	Homer F. Barnes

Philippine Islands

Baguio	Brent School	A. H. Richardson

SECTION XVI

SUPERINTENDENTS OF SCHOOLS IN PLACES OF 5000 POPULATION AND OVER

In the following list are included all places which are known to have a superintendent of schools and which, according to the 1930 Federal Census, have a population of 5,000 or over. These include incorporated cities, towns, boroughs and villages, unincorporated towns (in New England), and townships classified as urban by the Bureau of the Census. The names of the superintendents have been revised to December, 1939, and in some cases more recently.

References

(a) County superintendent. (b) Parish superintendent. (c) Supervising principal.

City	*Superintendent*
Alabama	
Andalusia	C. L. Martin
Anniston	C. C. Moseley
Bessemer	J. Clyde Orr
Birmingham	C. B. Glenn
Decatur	S. E. Alverson
Dothan	Bruce Flurry
Eufaula	T. G. Wilkinson
Fairfield	B. B. Baker
Florence	J. W. Powell
Gadsden	C. A. Donehoo
Huntsville	W. G. Hamm
Jasper	G. T. Patrick
Lanett	Taylor H. Kirby
Mobile	W. C. Griggs (a)
Montgomery	C. M. Dannelly (a)
Opelika	R. B. Mardre
Phenix City	L. P. Stough
Selma	Walter M. Jackson
Sheffield	C. M. Brewster
Talladega	Frank L. Harwell
Tarrant	W. A. Parker
Troy	L. D. Bynum
Tuscaloosa	H. G. Dowling (a)
Arizona	
Bisbee	R. E. Souers
Douglas	J. E. Carlson, Jr.
Globe	H. E. Stevenson
Miami	Ivan P. Hostetler
Morenci	Jos. H. Fairbanks
Nogales	A. J. Mitchell
Phoenix	John D. Loper (Elementary) E. W. Montgomery (High)
Prescott	Donald R. Sheldon
Tucson	C. E. Rose
Arkansas	
Blytheville	W. D. McClurkin
Camden	F. W. Whiteside
Conway	B. A. Short
El Dorado	J. I. McClurkin
Fayetteville	Frank S. Root
Fort Smith	J. W. Ramsey
Helena	J. F. Wahl
Hope	Miss Beryl Henry
Hot Springs National Park	Harvey H. Haley
Jonesboro	R. H. Moore
Little Rock	R. C. Hall
Malvern	J. L. Pratt
No. Little Rock	R. A. Cox
Paragould	Rufus D. Haynes
Pine Bluff	J. R. Allen
Russellville	W. E. Phipps
Texarkana	W. E. Gann
Van Buren	Virgle Coleman
California	
Alameda	Wm. G. Paden
Albany	Allen Keim
Alhambra	Geo. E. Bettinger
Anaheim	M. A. Gauer (Elementary) J. A. Clayes (High)
Arcadia	Elmer E. Westerhouse (Elementary)
Bakersfield	L. E. Chenoweth (Elementary) T. L. Nelson (Secondary)
Berkeley	Virgil E. Dickson
Beverly Hills	Merton E. Hill
Brawley	Geo. K. Anderson (Elementary) Percy Palmer (High)
Burbank	B. F. Enyeart
Burlingame	L. D. Henderson (Elementary)
Calexico	J. W. Lawson
Chico	F. F. Martin
Colton	J. H. Waldron
Compton	Mrs. Ardella B. Tibbey (Elementary) O. S. Thompson (Secondary)
Corona	Frank E. Bishop
Coronado	F. A. Boyer (Elementary) J. Leslie Cutler (High)
Culver City	Glenn A. Riddlebarger (Elementary)
Daly City	R. L. Crane, Jr. (Elementary) James Ferguson (High)
El Centro	Guy A. Weakley
Eureka	J. Warren Ayer
Fresno	Homer C. Wilson
Fullerton	R. E. Green (Elementary) Louis E. Plummer (Secondary)
Glendale	Willard S. Ford
Hanford	C. E. Denham (Elementary)
Hawthorne	Dan T. Williams (Elementary)
Hayward	Robert M. Reid (Elementary) H. B. Long (High)
Inglewood	Robert E. Cralle (Elementary) Harold O. Simar (High)
Lodi	LeRoy Nichols
Long Beach	K. E. Oberholtzer
Los Angeles	Vierling Kersey
Lynwood	W. R. Fouts (Elementary)
Martinez	Forrest V. Routt
Marysville	W. A. Kynoch
Merced	W. M. Smith (Elementary) A. W. Meany (High)
Modesto	J. H. Bradley
Monrovia	Dwight M. Lydell (Elementary) A. K. Wilson (High)
Montebello	C. D. Hardesty
Monterey	J. R. Croad (Elementary) J. R. McKillop (High)
Napa	Irene Snow (Elementary) E. E. Crawford (High)
National City	Fred M. Tonge (Elementary) J. M. McDonald (High)
Oakland	E. W. Jacobsen
Ontario	C. W. Randall (Elementary) Gardiner W. Spring (Secondary)
Orange	Don S. Danner (Elementary) A. Haven Smith (High)
Oxnard	C. A. Brittell
Pacific Grove	R. H. Down
Palo Alto	J. R. Overturf
Pasadena	J. A. Sexson
Petaluma	David M. Durst
Piedmont	Harry W. Jones
Pittsburg	F. S. Ramsdell
Pomona	Emmett Clark (Elementary) C. C. Winn (High)
Porterville	Emmet R. Berry (Elementary) B. H. Grisemer (Secondary)
Redlands	John Branigan
Redondo Beach	Harry P. McCandless (Elementary) Aileen S. Hammond (High)
Redwood City	Andrew Spinas (Elementary)
Richmond	W. T. Helms
Riverside	Ira C. Landis
Roseville	W. T. Eich (Elementary)
Sacramento	C. C. Hughes
Salinas	R. D. Case
San Bernardino	Albert D. Graves
San Diego	Will C. Crawford
San Francisco	J. P. Nourse
San Gabriel	Rolland H. Upton (Elementary)
San Jose	W. L. Bachrodt
San Leandro	Andrew J. Cartwright (Elementary)
San Luis Obispo	Charles E. Teach
San Mateo	Leil L. Young (Elementary) Homer Martin (High)
San Rafael	O. R. Hartzell
Santa Ana	Frank A. Henderson
Santa Barbara	Curtis E. Warren
Santa Cruz	Roy E. Simpson
Santa Maria	Robert A. Bruce (Elementary) Andrew P. Hill, Jr. (Secondary)
Santa Monica	Percy R. Davis

City	Superintendent
Santa Paula	George A. Bond (Elementary) F. M. Eakin (High)
Santa Rosa	Jerome O. Cross
South Pasadena	George C. Bush
Stockton	Ansel S. Williams
Tulare	W. B. Knokey
Vallejo	Elmer L. Cave
Ventura	Theodore Greider (Elementary) D. R. Henry (Secondary)
Visalia	DeWitt Montgomery
Watsonville	T. S. MacQuiddy
Whittier	Will E. Wiley (Elementary) D. A. Stouffer (High)
Woodland	T. L. Whitehead (Elementary)
Colorado	
Alamosa	G. P. Young
Boulder	Virgil M. Rogers
Canon City	L. L. Beahm
Colorado Springs	H. M. Corning
Denver	Charles E. Greene
Durango	Emory E. Smiley
Englewood	R. D. Jenkins
Fort Collins	Ward I. Miller
Grand Junction	J. Fred Essig
Greeley	Hubert D. Eldridge
La Junta	G. T. Wilson
Longmont	Kent L. Sanborn
Loveland	R. W. Truscott
Pueblo	District No. 1, J. H. Risley District No. 20, Ray E. Redmond
Salida	L. D. Hightower
Sterling	R. R. Knowles
Trinidad	William R. Ross
Walsenburg	S. M. Andrews
Connecticut	
Ansonia	John J. Stevens
Branford	R. E. Pinkham
Bridgeport	Worcester Warren
Bristol	Karl A. Reiche
Danbury	Harold F. Dow
Darien	Edward H. Fuller
Derby	Richard T. Tobin
E. Hartford	P. S. Barnes
E. Haven	W. E. Gillis
Enfield	E. H. Parkman
Fairfield	A. M. McCullough
Glastonbury	Francis S. Knox
Greenwich	Maynard W. Linn
Griswold	Ernest G. Lake
Groton	S. B. Butler
Hamden	Margaret L. Keefe
Hartford	Fred D. Wish, Jr.
Killingly	Norman C. Stickney
Manchester	Arthur H. Illing
Meriden	R. N. Brown
Middletown	Fred W. Shearer
Middletown (twp.)	Van Buren Moody
Milford	C. W. Maddocks
Naugatuck	H. E. Chittenden
New Britain	C. C. Ring
New Haven	J. A. Fitzgerald
New London	Warren A. Hanson
Norwalk	Philip A. Jakob
Norwich	James E. Murphy
Plainfield	J. L. Chapman
Plainville	Harold W. Thomas
Plymouth	H. S. Fisher
Putnam	Thomas W. Mahan
Rockville	Philip M. Howe
Seymour	H. L. Adams
Shelton	Harry E. Fowler
Southington	William M. Strong
Stafford	Earl M. Witt
Stamford	Leon C. Staples
Stonington	R. D. Tucker
Stratford	E. Ward Ireland
Torrington	G. J. Vogel
Vernon	P. M. Howe
Wallingford	H. M. Jeffords
Waterbury	Thomas J. Condon
Watertown	G. C. Swift
West Hartford	Lloyd H. Bugbee
West Haven	Seth G. Haley
Westport	Heath E. White
Wethersfield	Wilson Greer
Willimantic	Egbert A. Case
Windsor	Earle S. Russell
Winsted	L. R. McKusick
Delaware	
Wilmington	S. M. Stouffer
District of Columbia	
Washington	Frank W. Ballou
Florida	
Bartow	C. I. Hollingsworth (a)
Bradenton	Jessie P. Miller (a)
Clearwater	G. V. Fuguitt (a)
Coral Gables	J. T. Wilson (a) (Address Miami)
Daytona Beach	G. W. Marks (a) (Address Deland)
Deland	G. W. Marks (a)
Fort Lauderdale	Ulric J. Bennett (a)
Fort Myers	Harry F. Hendry (a)
Gainesville	Horace F. Zetrouer (a)
Jacksonville	R. C. Marshall (a)
Key West	M. E. Russell (a)
Lakeland	Carl S. Cox (a) (Address Bartow)
Lake Worth	John I. Leonard (a) (Address W. Palm Beach)
Miami	J. T. Wilson (a)
Miami Beach	J. T. Wilson (a) (Address Miami)
Ocala	Don T. Mann (a)
Orlando	Judson B. Walker (a)
Palatka	L. S. Barstow (a)
Panama City	A. L. Hardy (a)
Pensacola	J. H. Varnum (a)
Plant City	E. L. Robinson (a) (Address Tampa)
River Junction	C. H. Gray (a) (Address Quincy)
St. Augustine	D. D. Corbett (a)
St. Petersburg	G. V. Fuguitt (a) (Address Clearwater)
Sanford	T. W. Lawton (a)
Sarasota	T. W. Yarbrough (a)
Tallahassee	F. A. Rhodes (a)
Tampa	E. L. Robinson (a)
West Palm Beach	John I. Leonard (a)
Winter Haven	C. I. Hollingsworth (a) (Address Bartow)
Georgia	
Albany	J. O. Allen
Americus	S. C. Haddock
Athens	B. M. Grier
Atlanta	W. A. Sutton
Augusta	S. D. Copeland (a)
Bainbridge	E. G. Elcan
Brunswick	G. W. Wannamaker (a)
Carrollton	M. C. Wiley
Cartersville	W. H. Brandon
Cedartown	J. E. Purks
Columbus	Paul Munro
Cordele	D. H. Standard
Dalton	W. W. Stancil
Decatur	Lamar Ferguson
Dublin	A. J. Hargrove
East Point	Jere Wells (a)
Fitzgerald	Fred Ayres
Gainesville	C. J. Cheves
Griffin	S. N. Gardner
Lagrange	F. F. Rowe
Macon	W. P. Jones (a)
Marietta	C. A. Keith
Milledgeville	P. N. Bivins (a)
Moultrie	J. L. Yaden
Newnan	C. B. Mathews
Rome	B. F. Quigg
Savannah	O. B. Strong (a)
Thomasville	N. M. Huckabee, H. R. Mahler, Asso. Supts.
Valdosta	A. G. Cleveland
Waycross	Ralph Newton
Idaho	
Boise	W. D. Vincent
Coeur d'Alene	G. O. Phippeny
Idaho Falls	W. W. Christensen
Lewiston	Glenn W. Todd
Nampa	J. E. Walsh
Pocatello	E. Norman Vaughn
Twin Falls	Homer M. Davis
Illinois	
Alton	W. R. Curtis
Argo-Summit	Clarence Barrett
Aurora	K. D. Waldo (East Side) C. E. Larson (West Side)
Batavia	John B. Nelson
Beardstown	W. L. Gard
Belleville	H. V. Calhoun
Belvidere	R. E. Garrett
Benton	Charles M. Johnson
Berwyn	William Hawkes (Dist. No. 98) E. W. Martin (Dist. No. 100)
Bloomington	Paul Gossard
Blue Island	H. A. Perrin
Brookfield	E. N. Cassady
Cairo	Leo C. Schultz
Calumet City	Eric E. Brown
Canton	Ben Kietzman
Carbondale	Raymond Hoffner
Centralia	R. V. Jordan
Champaign	V. L. Nickell
Charleston	U. B. Jeffries
Chicago	Wm. H. Johnson
Chicago Heights	Ben A. Sylla
Cicero	G. A. Schwebel
Clinton	F. D. Merriman
Collinsville	E. B. Burroughs
Danville	C. E. Vance
Decatur	William Harris
De Kalb	F. W. Phillips
Des Plaines	E. R. Selleck
Dixon	A. H. Lancaster
Downers Grove	George E. De Wolf
Dundee	H. D. Jacobs
Du Quoin	Oren D. McClure
East Moline	D. B. Hoffman
East Peoria	Paul L. Bolin
East St. Louis	D. Walter Potts
Edwardsville	E. L. Alexander
Elgin	O. F. Patterson
Elmhurst	V. L. Beggs
Elmwood Park	George N. Wells
Evanston	J. R. Skiles (Dist. No. 75) David E. Walker (Dist. No. 76)
Forest Park	W. S. Dimmett
Freeport	B. F. Shafer
Galesburg	Richard V. Lindsey
Gillespie	J. W. White
Glencoe	Paul J. Misner
Glen Ellyn	S. A. Denison
Granite City	A. M. Wilson
Harrisburg	Russell Malan
Harvey	C. C. Thompson
Herrin	John R. Creek
Highland Park	R. H. Price (Dist. No. 107) Clark G. Wright (Dist. No. 108)
Hinsdale	Martin B. Travis
Hoopeston	W. R. Lowery
Jacksonville	R. O. Stoops
Johnston City	Earl E. Miller
Joliet	G. N. Hufford
Kankakee	Irving Munson
Kewanee	Charles A. Bruner
La Grange	J. C. Davies
Lake Forest	Melvin G. Davis
La Salle	E. G. Miller
Lawrenceville	M. N. Todd
Lincoln	D. F. Nickols

City	Superintendent
Litchfield	Oscar M. Chute
Lombard	C. E. Swingley
Macomb	C. S. Chappelear
Madison	E. W. Heob
Marion	H. O. Belford
Mattoon	H. B. Black
Maywood	Clarence H. Pygman, Acting
Melrose Park	Robert E. Murphy
Metropolis	C. J. Ramsay
Moline	E. P. Nutting
Monmouth	LeRoy Fetherston
Morris	L. E. Starke
Mount Carmel	R. S. Condrey
Mount Vernon	J. Lester Buford
Murphysboro	Wm. H. Carruthers
Naperville	R. E. Beebe
Niles Center	R. E. Cotanche (High) O. O. Young (Elementary)
Normal	Monroe Melton
North Chicago	F. E. De Yoe (Dist. No. 63) R. L. Newenham (Dist. No. 64)
Oak Park	W. J. Hamilton
Olney	C. T. Cramer
Ottawa	C. J. Byrne
Pana	T. Hamilton Hale
Paris	John R. Moss
Park Ridge	Harry D. Winslow
Pekin	C. B. Smith
Peoria	E. C. Fisher
Peru	C. W. Martin
Pontiac	A. F. Speltz
Quincy	R. O. Evans
River Forest	Ray E. Cheney
Riverside	L. J. Hauser
Rockford	Selmer H. Berg
Rock Island	Earl H. Hanson
St. Charles	G. E. Thompson
Savanna	W. D. Waldrip
Springfield	R. E. Fildes
Spring Valley	James Nesti
Sterling	O. A. Fackler (Dist. No. 11) H. U. Challand (Dist. No. 10)
Streator	H. K. Whittier
Summit	C. B. Barrett
Taylorville	Warren P. Shepherd
Urbana	T. H. Cobb
Venice	J. H. Gore
Villa Park	H. E. Hinkel
Waukegan	John S. Clark
West Frankfort	C. A. Waller
Wheaton	K. K. Tibbetts
Wilmette	J. R. Harper
Winnetka	C. W. Washburne
Wood River	G. A. Smith
Woodstock	W. J. Colahan
Zion	Edgar T. Stephens

Indiana

Anderson	Arthur Campbell
Auburn	H. L. McKenney
Bedford	H. H. Mourer
Bicknell	Harold Axe
Bloomington	H. E. Binford
Bluffton	L. R. Willey
Brazil	C. P. Keller
Clinton	E. C. Boyd
Columbus	Donald Du Shane
Connersville	E. C. Dodson
Crawfordsville	M. C. Darnall
Decatur	Walter J. Krick
East Chicago	Roy W. Feik
Elkhart	Harold H. Church
Elwood	William F. Smith
Evansville	J. Ralph Irons
Fort Wayne	Merle Abbett
Frankfort	M. N. O'Bannon
Franklin	R. W. Sheek
Gary	H. S. Jones
Goshen	Ort L. Walter
Greensburg	Carl Billings
Hammond	L. L. Caldwell
Hartford City	Joseph C. Wagner
Hobart	J. M. Sellers
Huntington	C. E. Byers
Indianapolis	DeWitt S. Morgan
Jeffersonville	W. F. Vogel
Kendallville	H. M. Dixon
Kokomo	C. V. Haworth
Lafayette	Morris E. McCarty
La Porte	Wendell R. Godwin
Lebanon	Paul Van Riper
Linton	T. J. Beecher
Logansport	Reed Groninger
Madison	E. O. Muncie
Marion	Elbert E. Day
Michigan City	M. L. Knapp
Mishawaka	P. C. Emmons
Mount Vernon	Stoy Hedges
Muncie	H. B. Allman
New Albany	C. B. McLinn
New Castle	R. H. Valentine
Peru	J. P. Crodian
Plymouth	Ray Kuhn
Portland	J. C. Webb
Princeton	G. E. Derbyshire
Richmond	W. G. Bate
Rushville	L. A. Lockwood
Seymour	N. J. Lasher
Shelbyville	W. F. Loper
South Bend	Frank E. Allen
Sullivan	Dale C. Billman
Terre Haute	George C. Carroll
Valparaiso	Roy B. Julian
Vincennes	V. L. Eikenberry
Wabash	O. J. Neighbours
Warsaw	James M. Leffel
Washington	Clyde Parker
West Lafayette	F. A. Burtsfield
Whiting	W. W. Borden

Iowa

Ames	Jordan L. Larson
Atlantic	W. H. Tate
Boone	H. J. Van Ness
Burlington	R. H. Bracewell
Cedar Falls	J. H. Peet
Cedar Rapids	Arthur C. Deamer
Centerville	E. W. Fannon
Chariton	J. R. Cougill
Charles City	P. C. Lapham
Cherokee	J. C. Hoglan
Clinton	M. M. Schell
Council Bluffs	J. A. True
Creston	Burton R. Jones
Davenport	Irvin H. Schmitt
Des Moines	A. W. Merrill
Dubuque	E. D. Cline
Fairfield	W. G. Pence
Fort Dodge	K. D. Miller
Fort Madison	A. I. Tiss
Iowa City	I. A. Opstad
Keokuk	R. L. Reid
Marshalltown	W. F. Shirley
Mason City	R. B. Irons
Muscatine	A. A. Johnson
Newton	B. C. Berg
Oelwein	R. D. Noble
Oskaloosa	R. J. Carroll
Ottumwa	Frank W. Douma
Perry	J. S. Vanderlinden
Red Oak	J. R. Inman
Shenandoah	W. Dean McKee
Sioux City	L. W. Feik
Spencer	H. J. Williams
Waterloo	J. M. Logan (East Side) Charles A. Kittrell (West Side)
Webster City	Burrus E. Beard

Kansas

Abilene	F. C. Gardner
Arkansas City	C. E. St. John
Atchison	W. D. Wolfe
Chanute	L. H. Petit
Coffeyville	K. W. McFarland
Concordia	E. B. Allbaugh
Dodge City	A. G. Schroedermeier
Eldorado	J. F. Hughes
Emporia	W. M. Richards
Fort Scott	V. M. Liston
Garden City	Ira O. Scott
Great Bend	H. C. Scarborough
Hutchinson	J. W. Gowans
Independence	J. H. Clement
Iola	John A. Fleming
Junction City	Donald A. McConnell
Kansas City	F. L. Schlagle
Lawrence	Clifford D. Dean
Leavenworth	I. J. Bright
Liberal	N. B. Mahuron
Manhattan	W. E. Sheffer
McPherson	R. W. Potwin
Newton	J. B. Heffelfinger
Ottawa	G. H. Marshall
Parsons	R. H. Hughes
Pittsburg	M. M. Rose
Pratt	Amos W. Glad
Salina	Chas. E. Hawkes
Topeka	A. J. Stout
Wellington	Claude Kissick
Wichita	L. W. Mayberry
Winfield	Evan E. Evans

Kentucky

Ashland	W. L. Brooker
Bellevue	W. H. Marshall
Bowling Green	L. C. Curry
Catlettsburg	Carl Hicks
Corbin	G. W. Campbell
Covington	G. O. Swing
Danville	E. F. Birckhead
Dayton	Olin W. Davis
Fort Thomas	D. W. Bridges
Frankfort	C. D. Redding
Glasgow	J. W. Depp
Hazard	R. T. Whittinghill
Henderson	C. E. Dudley
Hopkinsville	Gladstone Koffman
Jenkins	C. V. Snapp
Lexington	Henry H. Hill
Louisville	Zenos E. Scott
Ludlow	J. S. Brown
Madisonville	Harper Gatton
Mayfield	K. R. Patterson
Maysville	John Shaw
Middlesboro	J. W. Bradner
Newport	A. D. Owens
Owensboro	J. L. Foust
Paducah	H. L. Smith
Paris	Lee Kirkpatrick
Richmond	W. F. O'Donnell
Somerset	P. H. Hopkins
Winchester	B. B. Hodgkin

Louisiana

Alexandria	H. M. Wells (b)
Bastrop	E. D. Shaw (b)
Baton Rouge	C. B. Turner (b)
Bogalusa	M. J. Israel
Crowley	A. T. Browne (b)
Gretna	J. C. Ellis (b)
Hammond	C. C. Pittman (b)
Houma	H. L. Bourgeois (b)
Lafayette	J. W. Faulk (b)
Lake Charles	Ward Anderson
Minden	J. E. Pitcher (b)
Monroe	E. L. Neville
Morgan City	R. L. Robinson (b)
New Iberia	L. G. Porter (b)
New Orleans	Nicholas Bauer (b)
Opelousas	W. B. Prescott (b)
Plaquemine	L. P. Terrebonne (b)
Shreveport	E. W. Jones (b)
West Monroe	T. O. Brown (b)

Maine

Auburn	G. R. Gardner
Augusta	F. W. Burrill
Bangor	Arthur E. Pierce
Bath	John Parker
Belfast	Horatio S. Read
Biddeford	A. A. Garcelon
Brewer	H. R. Houston
Brunswick	Leon P. Spinney
Calais	Alden W. Allen
Caribou	G. M. Carter
Fairfield	W. H. Phinney

City	Superintendent
Gardiner	A. Raymond Carter
Houlton	Philip H. Woodworth
Lewiston	A. A. Woodworth
Millinocket	Earle F. Wingate
Old Town	Joseph A. Leonard
Portland	W. B. Jack
Presque Isle	R. J. Carpenter
Rockland	George J. Cumming
Rumford	L. E. Williams
Saco	Harry C. Hull
Sanford	J. A. Hamlin
Skowhegan	Raymond S. Finley
South Portland	L. C. Day
Waterville	C. E. Glover
Westbrook	Guy V. Sinclair

Maryland

Annapolis	George Fox (a)
Baltimore	D. E. Weglein
Cambridge	W. Theodore Boston (a)
Cumberland	Charles L. Kopp (a)
Frederick	E. W. Pruitt (a)
Frostburg (Address Cumberland)	C. L. Kopp (a)
Hagerstown	B. J. Grimes (a)
Salisbury	J. M. Bennett (a)
Tacoma Park (Address Rockville)	Edwin W. Broome (a)

Massachusetts

Abington	Franklin P. Hawkes
Adams	J. F. Farrell
Agawam	B. J. Phelps
Amesbury	Fred C. English
Amherst	L. L. Dudley
Andover	Kenneth L. Sherman
Arlington	Joseph S. Keating
Athol	William A. Spooner
Attleboro	L. A. Fales
Auburn	C. M. Harris
Barnstable	Melvin C. Knight
Belmont	Frank A. Scott
Beverly	Starr M. King
Billerica	E. C. Vining
Boston	Arthur L. Gould
Braintree	C. E. Fisher
Bridgewater	John C. Davis
Brockton	John L. Miller
Brookline	E. R. Caverly
Cambridge	M. E. Fitzgerald
Canton	Richard N. Anketell
Chelmsford	G. S. Wright
Chelsea	Leo P. Casey
Chicopee	J. J. Desmond, Jr.
Clinton	T. F. Gibbons
Concord	H. Paul Larrabee
Danvers	I. G. Smith
Dartmouth	Caleb H. Niles
Dedham	J. C. Anthony
Dracut	James C. Riley
Easthampton	H. D. Casey
Easton	G. C. Mann
Everett	F. A. Ashley
Fairhaven	F. M. Gifford
Fall River	H. L. Belisle
Falmouth	Paul Dillingham
Fitchburg	George C. Francis
Foxborough	Chase McArthur
Framingham	Burr J. Merriam
Franklin	A. W. Hale
Gardner	F. T. Reynolds
Gloucester	E. W. Fellows
Grafton	Robert W. Barclay
Great Barrington	Kenneth Frank Preston
Greenfield	F. W. Porter
Haverhill	A. I. Clow
Hingham	O. K. Collins
Holyoke	W. R. Peck
Hudson	E. J. Harriman
Ipswich	Harry S. Merson
Lawrence	Dennis E. Callahan
Leominster	Wm. B. Appleton
Lexington	T. S. Grindle
Lowell	V. M. McCartin
Ludlow	P. R. Baird
Lynn	H. S. Gruver
Malden	F. G. Marshall
Mansfield	Bert L. Merrill
Marblehead	James W. Vose
Marlboro	E. P. Carr
Maynard	J. P. King
Medford	J. S. Kadesch
Melrose	H. H. Stuart
Methuen	L. H. Conant
Middleboro	J. S. Cushing
Milford	A. O. Caswell
Millbury	William D. Shea
Milton	H. F. Turner
Montague	Arthur E. Burke
Natick	C. R. Hall
Needham	Harry A. Brown
New Bedford	A. P. Keith
Newburyport	C. R. Thibadeau
Newton	Julius E. Warren
North Adams	John F. McGrory
Northampton	William R. Barry
North Andover	F. E. Pitkin
North Attleboro	G. W. Morris
Northbridge	H. J. Phipps
Norwood	Lincoln D. Lynch
Orange	E. R. Sawyer
Palmer	C. H. Hobson
Peabody	Wm. A. Welch
Pittsfield	Edward J. Russell
Plymouth	A. B. Handy
Quincy	J. N. Muir
Randolph	A. O. Christiansen
Reading	E. C. Grover
Revere	C. F. Lindstol
Rockland	R. S. Esten
Salem	G. M. Bemis
Saugus	Vernon W. Evans
Shrewsbury	M. A. Sturtevant
Somerset	H. F. Bates
Somerville	E. W. Ireland
Southbridge	Channing H. Greene
South Hadley Falls	Albert T. Patty
Spencer	I. H. Agard
Springfield	John E. Granrud
Stoneham	C. E. Varney
Stoughton	Warren B. Lyman
Swampscott	Frank L. Mansur
Taunton	W. A. Mowry
Tewksbury (Address Wilmington)	S. G. Bean
Uxbridge	A. B. Garcelon
Wakefield	W. B. Atwell
Walpole	A. C. Jones
Waltham	W. H. Slayton
Ware	M. Leroy Greenfield
Wareham	Parker N. Moulton
Watertown	Francis A. Kelly
Webster	J. A. Lobban
Wellesley	Edwin H. Miner
Westboro	J. H. Armstrong
Westfield	C. D. Stiles
West Springfield	J. R. Fausey
Weymouth	P. T. Pearson
Whitman	F. E. Holt
Winchendon	C. A. Mitchell
Winchester	J. J. Quinn
Winthrop	Arthur E. Boudreau
Woburn	Daniel P. Hurld
Worcester	W. S. Young

Michigan

Adrian	George H. Little
Albion	George Walkotten
Alma	F. R. Phillips
Alpena	Russell H. Wilson
Ann Arbor	O. W. Haisley
Battle Creek	Eldon C. Geyer
Bay City	Benj. Klager
Benton Harbor	S. C. Mitchell
Berkley	M. P. Anderson
Birmingham	Howard D. Crull
Cadillac	R. C. Shankland
Charlotte	Jay Dykhouse
Coldwater	Robert E. Sharer
Dearborn	Ray H. Adams
Detroit	Frank Cody
Dowagiac	James Lewis
East Detroit	John N. Kantner
Ecorse	Arthur G. Erickson
Escanaba	John A. Lemmer
Ferndale	E. F. Down
Flint	L. H. Lamb
Gladstone	A. R. Watson
Grand Haven	E. H. Babcock
Grand Rapids	A. W. Krause
Grosse Pointe	E. R. Van Kleeck
Hamtramck	M. A. Kopka
Hancock	O. M. Vedder
Hastings	D. A. Van Buskirk
Highland Park	W. H. Lemmel
Hillsdale	B. L. Davis
Holland	E. E. Fell
Ionia	A. A. Rather
Iron Mountain	John Jelsch
Ironwood	Arthur E. Erickson
Ishpeming	C. L. Phelps
Jackson	Harold Steele
Kalamazoo	Loy Norrix
Kingsford (Address Iron Mountain)	Frank C. Sweeney
Lansing	J. W. Sexton
Lapeer	E. E. Irwin
Lincoln Park	Leo W. Huff
Ludington	H. H. Hawley
Manistee	Dorr L. Wilde
Manistique	A. F. Hall
Marquette	W. M. Whitman
Marshall	H. W. Holmes
Menominee	J. L. Silvernale
Midland	J. J. Schafer
Monroe	George T. Cantrick
Mount Clemens	L. W. Fast
Mount Pleasant	Chas. B. Park
Muskegon	John A. Craig
Muskegon Heights	W. R. Booker
Negaunee	H. S. Doolittle
Niles	F. W. Crawford
Owosso	E. J. Willman
Petoskey	H. C. Spitler
Pontiac	Robert B. French
Port Huron	L. A. Packard
River Rouge	A. McDonald
Roseville	Glenn Schoenhals
Royal Oak	N. J. Quickstad
Saginaw	C. F. Miller
St. Clair Shores	Bruce B. Calkins
St. Joseph	E. B. Holden
Sault Ste. Marie	G. G. Malcolm
Sturgis	Paul M. Winger
Three Rivers	Walter Horst
Traverse City	Glenn E. Loomis
Wyandotte	F. W. Frostic
Ypsilanti	E. H. Chapelle

Minnesota

Albert Lea	H. R. Peterson
Austin	S. T. Neveln
Bemidji	J. W. Smith
Brainerd	G. B. Ferrell
Chisholm	J. P. Vaughan
Cloquet	E. B. Anderson
Columbia Heights	H. C. Nelson
Crookston	L. M. Wikre
Duluth	H. H. Eelkema
Ely	Stanley Adkins
Eveleth	A. D. S. Gillett
Fairmont	John J. Skinner
Faribault	C. Willard Cross
Fergus Falls	L. H. Dominick
Hastings	Roy E. Miller
Hibbing	Sydney A. Patchin
International Falls	J. A. Sathrum
Little Falls	James K. Michie
Mankato	J. E. Anderson
Minneapolis	C. R. Reed
Moorhead	S. G. Reinertsen
New Ulm	W. A. Andrews
Owatonna	Irvin E. Rosa
Red Wing	G. V. Kinney
Rochester	G. H. Sanberg
St. Cloud	H. B. Gough
St. Paul	Paul S. Amidon
South St. Paul	Irvin T. Simley
Stillwater	Guy D. Smith
Virginia	L. A. Lavine
Willmar	A. M. Wisness
Winona	Harold C. Bauer

City	Superintendent
Mississippi	
Biloxi	G. W. Ditto
Brookhaven	Edgar S. Bowlus
Clarksdale	H. B. Heidelberg
Columbus	C. N. Brandon
Corinth	Hal Anderson
Greenville	F. W. Murphy
Greenwood	W. C. Williams
Gulfport	B. Frank Brown
Hattiesburg	S. H. Blair
Jackson	K. P. Walker
Laurel	R. H. Watkins
McComb	D. L. Blackwelder
Meridian	H. M. Ivy
Natchez	W. H. Braden
Tupelo	T. M. Milam
Vicksburg	R. E. Selby (a)
Yazoo City	R. J. Koonce
Missouri	
Boonville	L. E. Ziegler
Brookfield	L. V. Crookshank
Cape Girardeau	L. J. Schultz
Carthage	J. L. Campbell
Chillicothe	H. R. McCall
Clayton	John L. Bracken
Clinton	Arthur Lee
Columbia	W. E. Rosenstengel
De Soto	O. T. Coil
Flat River	Wesley A. Deneke
Fulton	Tom Conrad
Hannibal	E. T. Miller
Independence	W. E. Matthews
Jefferson City	R. T. Scobee
Joplin	E. A. Elliott
Kansas City	George Melcher
Kirksville	J. H. Neville
Kirkwood	F. P. Tillman
Maplewood	G. E. Dille
Marshall	Willard J. Graff
Maryville	H. S. Thomas
Mexico	L. B. Hawthorne
Moberly	M. F. Beach
Nevada	Jerry J. Vineyard
Poplar Bluff	G. R. Loughead
St. Charles	Stephen Blackhurst
St. Joseph	T. E. Dale
St. Louis	Henry J. Gerling
Sedalia	Heber U. Hunt
Sikeston	R. A. Harper
Springfield	Harry P. Study
Trenton	S. M. Rissler
University City	Charles Banks
Warrensburg	Edward Beatty
Washington	C. J. Burger
Webb City	D. R. McDonald
Webster Groves	W. E. Goslin
Wellston	Millard M. Halter
Montana	
Anaconda	W. K. Dwyer
Billings	M. C. Gallagher
Bozeman	D. S. Williams
Butte	Lowell W. Johnson
Great Falls	Irving W. Smith
Havre	John Shively
Helena	Payne Templeton
Kalispell	W. D. Swetland
Lewistown	C. G. Manning
Livingston	B. A. Winans
Miles City	W. E. Stegner
Missoula	Ira B. Fee
Nebraska	
Alliance	H. R. Partridge
Beatrice	E. L. Novotny
Columbus	R. R. McGee
Fairbury	W. E. Scott
Falls City	A. B. Gelwick
Fremont	John G. Hansen
Grand Island	C. Ray Gates
Hastings	A. H. Staley
Kearney	Harry A. Burke
Lincoln	M. C. Lefler
McCook	F. L. Holmes
Nebraska City	Marion R. Shrader
Norfolk	A. P. Burkhardt
North Platte	W. J. Braham
Omaha	Homer W. Anderson
Scottsbluff	J. E. Shedd
York	Earle W. Wiltse
Nevada	
Las Vegas	Maude Frazier
Reno	E. Otis Vaughn
New Hampshire	
Berlin	Clare N. Pettit
Claremont	A. B. Kellogg
Concord	Chester A. Moody
Derry	Edward I. Erickson
Dover	Gordon L. Fox
Franklin	Fred S. Libbey
Keene	Laurence O. Thompson
Laconia	John S. Gilman
Lebanon	W. J. English
Manchester	Austin J. Gibbons
Nashua	Earle T. Tracey
Portsmouth	Harry L. Moore
Rochester	Arthur S. Rollins
Somersworth	H. L. Winslow
New Jersey	
Asbury Park	Amos E. Kraybill
Atlantic City	Arthur S. Chenoweth
Audubon	William L. Fidler
Bayonne	Preston H. Smith
Belleville	Wayne R. Parmer
Bergenfield	Roy W. Brown
Bloomfield	Edgar S. Stover
Bogota	Grant W. Leman
Boonton	M. Burr Mann
Bound Brook	Albert S. Davis (c)
Bridgeton	Leigh M. Lott
Burlington	Vann H. Smith
Caldwell	Paul H. Axtell
Camden	Leon N. Neulen
Carlstadt	Edward F. Krom
Carteret	Calvin F. Dengler
Cliffside Park	George F. Hall
Clifton	George J. Smith
Collingswood	Carl M. Diefenbach
Cranford	Howard R. Best
Dover	R. S. Bowlby
Dumont	Charles A. Selzer
Dunellen	Ralph W. Crane
East Orange	Henry E. Kentopp
East Rutherford	Alfred S. Faust
Elizabeth	Ira T. Chapman
Englewood	Winton J. White
Fairlawn	F. H. Brunswick
Fairview	Z. G. Masten, Jr.
Fort Lee	J. B. Thompson
Freehold	Lloyd S. Cassel
Garfield	Joseph F. Moriarty
Glen Ridge	H. W. Dutch
Gloucester City	Marvin E. Porch
Guttenburg	Mrs. Anna L. Klein
Hackensack	George A. Merrill
Haddonfield	Everett C. Preston
Haddon Heights	William C. Davis
Hammonton	H. H. Smith
Harrison	John P. Murray
Hasbrouck Heights	C. C. Hitchcock
Hawthorne	Stephen W. Moshier
Highland Park	F. W. Furth
Hillside	A. G. Woodfield
Hoboken	Daniel S. Kealey
Irvington	Herschel S. Libby
Jersey City	James A. Nugent
Kearny	Edmund L. Tink
Lakewood	Carl M. Bair
Leonia	Nelson C. Smith
Linden	Paul R. Brown
Lodi	Henry V. Matthews
Long Branch	William M. Smith
Lyndhurst	H. P. Shepherd
Madison	Harry A. Wann
Manville	John W. Zorella
Metuchen	Elmo E. Spoerl (High) Mr. Roos (Elementary)
Millburn twp.	John R. Patterson
Millville	G. Edward McComsey
Montclair	A. L. Threlkeld
Morristown	J. Burton Wiley
Neptune twp.	O. J. Moulton
Newark	Stanley H. Rolfe
New Brunswick	Frederick J. Sickles
Newton	C. H. Reagle
North Arlington	W. R. Holbert
North Bergen	R. W. Madden
North Plainfield	Beekman R. Terhune
Nutley	John A. Spargo
Ocean City	George E. Brown
Orange	W. B. Patrick
Palisades Park	John W. Fuchs
Passaic	Arthur D. Arnold
Paterson	John R. Wilson
Paulsboro	Paul R. Carl
Penns Grove	A. J. Dohner
Pensauken twp.	George B. Fine
Perth Amboy	W. C. McGinniss
Phillipsburg	Clarence V. Sloan
Pitman	Daniel W. Davis
Plainfield	F. W. Cook
Pleasantville	Simon M. Horstick
Princeton	B. Woodhull Davis
Prospect Park (Address Hawthorne)	Edmund H. Viemeister
Rahway	Arthur L. Perry
Raritan twp. (Address Perth Amboy, R. #1)	Fred A. Talbot
Red Bank	Edwin C. Gilland
Ridgefield Park	A. Ray Palmer
Ridgewood	I. B. Somerville
Roselle	Joseph L. Bustard
Roselle Park	E. F. Smith
Rutherford	Guy L. Hilleboe
Salem	Halliday B. Jackson
Sayreville	Jesse Selner
Secaucus	M. J. Pechtel
Somerville	T. Latimer Brooks
South Amboy	Oscar O. Barr
South Orange	John H. Bosshart
South Plainfield	Harry C. Fries
South River	Lester A. Rodes
Summit	John B. Dougall
Teaneck	Lester N. Neulen
Tenafly	George A. Kipp
Trenton	Paul Loser
Union City	Albert C. Parker
Union twp.	Charles T. Hassard
Ventnor	Eliz. McNulty (Elementary)
Verona	C. Vincent Geiger
Vineland	Lawrence R. Winchell
Wallington	Thomas L. Harty (c)
Weehawken	Kenneth F. Woodbury
Westfield	C. A. Philhower
West New York	Harry L. Bain
West Orange	S. C. Strong
Wildwood	Lanning A. Myers
Woodbridge	V. C. Nicklas
Woodbury	Harry L. Stearns
Woodridge	Fremont D. Donley
New Mexico	
Albuquerque	John Milne
Clovis	J. M. Bickley
Gallup	Chas. E. Emery
Las Cruces	C. S. Conlee
Raton	E. E. Harrison
Roswell	J. D. Shinkle
Santa Fe	R. P. Sweeney
New York	
Albany	Austin R. Coulson
Amsterdam	Heth G. Coons
Auburn	Charles G. Hetherington
Baldwin	Arthur E. Newton
Batavia	Clyde P. Wells
Bay Shore	George H. Gatje
Beacon	E. D. Hewes
Binghamton	Daniel J. Kelly
Bronxville	Frederick H. Bair
Buffalo	Robt. T. Bapst
Canandaigua	W. Howard Vanderhoef
Catskill	Maurice S. Hammond
Cedarhurst (Address Lawrence)	Lawrence V. Dodd
Cohoes	William S. Schneider

City	Superintendent
Corning	William E. Severn (Dist. No. 9) Hugh W. Gregg (Dist. No. 13)
Cortland	E. G. Simmons
Depew	George R. Crego
Dobbs Ferry	J. A. McGinness
Dunkirk	J. J. Wheeler
East Rochester	Theodore L. R. Morgan
Elmira	Oscar F. Kerlin
Elmira Heights	John W. Sahlstrom
Endicott	Herbert H. Crumb
Floral Park	Alvah T. Stanforth
Fredonia	Claude R. Dye
Freeport	John W. Dodd
Fulton	George R. Bodley
Garden City	Frank R. Wassung
Geneva	W. L. Houseman
Glen Cove	H. H. Chapman
Glens Falls	A. W. Miller
Gloversville	H. W. Langworthy
Harrison	L. M. Klein
Hastings-on-Hudson	John L. Hopkins
Haverstraw	Aloysius J. Lynch
Hempstead	William A. Gore
Herkimer	Loraine W. Bills
Hornell	Harrison S. Dodge
Hudson	John T. Kaemmerlen
Hudson Falls	Dana M. King
Huntington	Raymond C. Burdick
Ilion	Earl P. Watkin
Irondequoit	Alfred C. Hamilton (Address Rochester)
Ithaca	C. L. Kulp
Jamestown	Clinton V. Bush
Johnson City	H. B. Eccleston
Johnstown	E. L. Ackley
Kenmore	F. C. Densberger
Kingston	Arthur J. Laidlaw
Lackawanna	Clarence A. Conway
Lancaster	Frank L. Smith
Lansingburg	Neil K. White (Address Troy)
Little Falls	Harold L. Corzett
Lockport	R. B. Kelley
Long Beach	Walter J. Schwalje
Lynbrook	H. Arthur Schubert
Malone	Horace H. Lamberton
Mamaroneck	Arthur Z. Boothby
Massena	Martin A. Helfer
Mechanicville	John N. Hayes
Medina	A. E. Trippensee
Middletown	Carl V. Warren
Mineola	Harlan B. Allen
Mount Kisco	H. M. Jennings
Mount Vernon	William H. Holmes
Newark	Edwin R. Woelfel
Newburgh	Snyder J. Gage
New Rochelle	Herold C. Hunt
New York	Harold G. Campbell
Niagara Falls	James F. Taylor
North Tarrytown	Delbert O. Fuller
North Tonawanda	B. A. Leonard
Norwich	Gilbert R. Lyon
Nyack	K. R. MacCalman
Ogdensburg	Frank C. Roda
Olean	W. C. Greenawalt
Oneida	Albert H. Covell
Oneonta	George J. Dann
Ossining	Harold V. Loomis
Oswego	Charles E. Riley
Oyster Bay	Leon J. Deming
Patchogue	Sheridan Linn
Peekskill	J. E. Scott
Penn Yan	Clayton E. Rose
Plattsburg	G. M. Elmendorf
Port Chester	Evan E. Jones
Port Jervis	A. H. Naylor
Poughkeepsie	Fox D. Holden
Rensselaer	Walter S. Clark
Rochester	James M. Spinning
Rockville Center	Floyd B. Watson
Rome	George R. Staley
Roslyn	F. R. Wegner
Rye	A. Verne MacCullough(c)
Salamanca	George A. Place
Saranac Lake	H. V. Littell
Saratoga Springs	Harris Crandall
Scarsdale	Vernon G. Smith
Schenectady	W. H. Pillsbury
Scotia	B. W. Conrad
Seneca Falls	Frank P. Page
Solvay	Clinton H. Atwood
Syracuse	G. Carl Alverson
Tarrytown	J. Leroy Thompson
Tonawanda	Henry L. Cecil
Troy	George H. Krug (Union District)
Tuckahoe	Joseph R. Gardner (Dist. No. 1) John C. Goff (Dist. No. 2)
Tupper Lake	R. E. Minnich
Utica	John A. De Camp
Valley Stream	W. C. Mepham
Watertown	C. E. Sabin
Watervliet	William Richmond
Waverly	Don W. McClelland
Wellsville	George F. Jammer
Whitehall	Page E. Cole
White Plains	H. Claude Hardy
Yonkers	Wm. Ward Ankenbrand

North Carolina

Asheboro	Reginald Turner
Asheville	R. H. Latham
Burlington	L. E. Spikes
Canton	A. J. Hutchins
Charlotte	H. P. Harding
Concord	A. S. Webb
Durham	W. F. Warren
Elizabeth City	E. E. Bundy
Fayetteville	Horace Sisk
Gastonia	W. P. Grier
Goldsboro	Ray Armstrong
Greensboro	B. L. Smith
Greenville	J. H. Rose
Henderson	E. M. Rollins (a)
Hendersonville	F. M. Waters
Hickory	R. W. Carver
High Point	C. F. Carroll, Jr.
Kings Mountain	B. N. Barnes
Kinston	W. A. Graham
Lenoir	C. S. Warren
Lexington	L. E. Andrews
Monroe	W. R. Kirkman
Mooresville	H. C. Miller
Morganton	W. S. Hamilton
Mount Airy	L. B. Pendergraph
New Bern	H. B. Smith
Raleigh	Claude F. Gaddy
Reidsville	L. J. Perry
Rocky Mount	R. M. Wilson
Salisbury	J. H. Knox
Shelby	W. E. Abernathy
Statesville	R. M. Gray
Tarboro	W. A. Mahler
Thomasville	J. N. Hauss
Washington	E. S. Johnson
Wilmington	H. M. Roland (a)
Wilson	S. G. Chappell
Winston-Salem	J. W. Moore

North Dakota

Bismarck	H. O. Saxvik
Devils Lake	F. H. Gilliland
Dickinson	A. L. Hagen
Fargo	H. H. Kirk
Grand Forks	Elroy Schroeder
Jamestown	Wm. S. Gussner
Mandan	J. C. Gould
Minot	L. A. White
Valley City	G. W. Hanna
Williston	J. N. Urness

Ohio

Akron	Ralph H. Waterhouse
Alliance	B. F. Stanton
Ashland	J. E. Bohn
Ashtabula	M. S. Mitchell
Athens	Harper C. Pendry
Barberton	U. L. Light
Bedford	A. E. Moody
Bellaire	J. V. Nelson
Bellefontaine	S. A. Frampton
Bellevue	W. L. Arnholt
Berea	J. F. Koeppe
Bexley	H. C. Dieterich
Bowling Green	H. L. Bowman
Bucyrus	D. C. Baer
Cambridge	Hugh R. Hick
Campbell	Andrew S. Klinko
Canton	Jesse H. Mason
Chillicothe	M. M. Berry
Cincinnati	C. V. Courter
Circleville	Frank Fischer
Cleveland	Charles H. Lake
Cleveland Heights	Frank L. Wiley
Columbus	Geo. E. Roudebush
Conneaut	Norman Koontz
Coshocton	A. C. Pence
Cuyahoga Falls	Gilbert Roberts
Dayton	Emerson H. Landis
Defiance	N. G. Fawcett
Delaware	D. R. Smith
Delphos	E. W. Bell
Dover	C. E. Palmer
East Cleveland	O. J. Korb
East Liverpool	Herbert G. Means
East Palestine	T. R. Hersh
Elyria	R. C. Maston
Euclid	Russell H. Erwine
Findlay	F. L. Kinley
Fostoria	H. L. Ford
Fremont	U. E. Diener
Galion	O. E. Hill
Gallipolis	E. E. Higgins
Garfield Heights	Harold R. Maurer
Girard	E. O. Trescott
Grandview Heights (Columbus P. O.)	W. C. Rohleder
Greenville	C. L. Bailey
Hamilton	Clyde W. White
Ironton	John A. Miller
Jackson	T. K. Owens
Kent	J. W. Spangler
Kenton	L. E. McKinley
Lakewood	Geo. A. Bowman
Lancaster	Paul Wenger
Lima	J. McLean Reed
Lockland	J. U. Dungan
Logan	G. E. Carr
Lorain	P. C. Bunn
Mansfield	W. L. Miller
Maple Heights	A. E. Hadfield
Marietta	H. L. Sullivan
Marion	C. A. Hudson
Martins Ferry	F. L. Teal
Massillon	L. J. Smith
Miamisburg	Harris V. Bear
Middletown	R. W. Solomon
Mingo Junction	M. L. Dennis
Mount Vernon	A. W. Elliott
Nelsonville	E. J. Arnold
Newark	Paul B. Edwards
New Boston	J. W. Evans
New Philadelphia	H. S. Carroll
Niles	S. J. Bonham
Norwalk	H. C. Ellis
Norwood	Harold S. Bates
Oakwood (Dayton P. O.)	A. E. Claggett
Painesville	C. C. Pierce
Parma	F. S. Shields
Piqua	G. C. Dietrich
Portsmouth	Frank Appel
Ravenna	H. L. Brown
Reading	H. L. Bussey
Rocky River	J. J. Young
St. Bernard	W. E. Melvin
St. Marys	C. C. McBroom
Salem	E. S. Kerr
Sandusky	Karl Whinnery
Shaker Heights	Arthur K. Loomis
Shelby	C. G. Keck
Sidney	C. C. Crawford
Springfield	H. L. Stevens
Steubenville	Russell E. Schafer
Struthers	H. E. Zuber
Tiffin	Paul V. Brown
Toledo	E. L. Bowsher
Toronto	S. C. Dennis
Troy	T. E. Hook
Uhrichsville	H. B. Galbraith
Urbana	R. M. Fosnight
Van Wert	C. D. Fox

City	Superintendent
Wadsworth	Frank H. Close
Wapakoneta	M. R. Simpson
Warren	H. B. Turner
Washington Court House	L. W. Reese
Wellston	H. L. Holter
Wellsville	S. E. Daw
Wilmington	H. W. Hodson
Wooster	C. M. Layton
Xenia	R. J. Warner
Youngstown	Pliny H. Powers
Zanesville	Kenneth C. Ray

Oklahoma

Ada	C. D. Procter
Altus	A. G. Steele
Alva	H. L. Hensley
Anadarko	R. L. McLean
Ardmore	George D. Hann
Bartlesville	H. E. Wrinkle
Blackwell	Harry Huston
Bristow	E. H. Black
Chickasha	Bruce J. Myers
Clinton	Arnett Cross
Cushing	W. B. French
Duncan	N. L. George
Durant	G. T. Stubbs
Elk City	A. M. Keeth
El Reno	Paul R. Taylor
Enid	DeWitt Waller
Guthrie	W. A. Greene
Henryetta	E. E. Battles
Holdenville	G. S. Sanders
Hugo	Harvey M. Black
Lawton	B. C. Swinney
McAlester	Verl A. Teeter
Miami	R. C. Nichols
Muskogee	J. R. Holmes
Norman	J. Don Garrison
Oklahoma City	C. K. Reiff
Okmulgee	W. Max Chambers
Pawhuska	Ross C. Kendall
Picher	W. W. Schultze
Ponca City	C. P. Howell
Sand Springs	Clyde Boyd
Sapulpa	E. O. Shaw
Seminole	John G. Mitchell
Shawnee	A. L. Burks
Stillwater	E. D. Price
Tulsa	H. W. Gowans
Wewoka	Harry D. Simmons
Woodward	R. R. Russell

Oregon

Albany	R. E. McCormack
Astoria	A. C. Hampton
Baker	A. E. Hirschler
Bend	Howard George
Corvallis	J. F. Schenk
Eugene	J. F. Cramer
Klamath Falls	J. P. Wells
La Grande	A. L. Gralapp
Marshfield	Lynn A. Parr
Medford	E. H. Hedrick
Oregon City	J. T. Longfellow
Pendleton	Austin Landreth
Portland	R. E. Dugdale
Salem	Frank B. Bennett
The Dalles	Paul R. McCulloch

Pennsylvania

Abington	Joseph C. Weirick
Aliquippa	Lytle M. Wilson
Allentown	Wm. L. Connor
Altoona	Levi Gilbert
Ambridge	J. R. Miller
Archbald	John F. Moran
Arnold	H. L. Holste
Ashland	Joseph H. Davison
Ashley	Robert C. Metz
Avalon	S. Todd Perley
Bangor	Harry O. Eisenberg
Beaver	G. A. McCormick
Beaver Falls	J. Roy Jackson
Bellevue	Harry E. Brumbaugh
Bensalem twp. (Address Cornwells Heights)	Samuel K. Faust
Berwick	M. E. Houck
Bethlehem	William Howard Weiss
Blairsville	N. Montgomery (c)
Blakely Boro. (Address Peckville)	H. B. Anthony
Bloomsburg	L. P. Gilmore (c)
Brackenridge	R. R. Anderson (c)
Braddock	W. C. Evans
Bradford	Floyd C. Fretz
Brentwood	J. D. Boydston (c)
Bridgeport	C. C. Smith
Bristol	Warren P. Snyder
Butler	Roy W. Wiley
Canonsburg	Clinton A. Mathewson
Carbondale	Mary B. McAndrew
Carlisle	J. W. Potter
Carnegie	Norman L. Glasser
Cecil twp. (Address Canonsburg)	H. S. Kuder
Centerville (Address West Brownsville)	C. H. Lyon (c)
Chambersburg	U. L. Gordy
Charleroi	T. L. Pollock
Cheltenham twp. (Address Elkins Park)	Frank C. Ketler
Chester	F. Herman Fritz
Clairton	H. D. Teal
Clearfield	S. F. W. Morrison
Clifton Heights	Chas. A. Brinton (c)
Coaldale	R. B. Harvey (c)
Coal twp. (Address Shamokin)	P. F. Brennan
Coatesville	H. R. Vanderslice
Collingdale	F. E. Stengle
Columbia	J. B. Kennedy
Connellsville	William G. Davis
Conshohocken	Robert C. Landis
Coraopolis	G. W. Cassler (c)
Corry	Ralph S. Dewey
Crafton	Denton M. Albright
Danville	E. B. Cline (c)
Darby	W. R. Douthett
Derry twp. (Address Hershey)	J. I. Baugher
Dickson City Boro.	P. M. Brennan
Donora	John E. Shambach
Dormont	David H. Stewart
Du Bois	Herbert E. Reisgen
Dunbar twp. (Address Leisenring)	W. E. Tiethohl
Dunmore	J. R. Gilligan
Dupont	C. T. Dugan (c)
Duquesne	Fred C. Gillespie
Duryea	J. J. Joyce (c)
Easton	James C. Bay
East Pittsburgh	Charles F. Young
East Stroudsburg	Carl T. Secor
Edwardsville	V. E. Lewis (c)
Ellwood City	J. Ellis Bell
Emaus	H. J. Yeager
Erie	C. Herman Grose
Etna	Clayton L. McMillen
Exeter	John B. Campbell
Farrell	W. W. Irwin
Fell twp. (Address Carbondale)	John H. Campbell
Ford City	Quincey G. Vincent
Forest City	Jules J. Kerl
Forty Fort	Frank W. Walp (c)
Frackville	Wm. R. Trautman (c)
Franklin	Karl M. Russell
Freeland	N. P. Luckenbill (c)
German twp. (Address McClellandtown)	J. Carman Newcomer
Gettysburg	L. C. Keefauver
Glassport	M. J. Naser (c)
Greensburg	Wm. H. McIlhattan
Greenville	A. Bruce Denniston
Grove City	H. M. B. Lehn
Hanover	Robert A. Bagshaw
Harrisburg	B. R. Abernethy
Haverford twp. (Address Upper Darby)	J. Frank Carter
Hazle twp. (Address Hazleton)	Joseph D. Gallagher
Hazleton	Thomas L. Hinkle
Hollidaysburg	Hobson C. Wagner
Homestead	Port Eckles
Honesdale	J. J. Koehler
Huntingdon	J. G. Everard
Indiana	E. C. Perry
Jeannette	Foster B. Snowden
Jersey Shore	Charles W. Potter (c)
Johnsonburg	G. E. Engstrom
Johnstown	Dale D. McMaster
Kane	Glennis H. Rickert
Kingston	Bela B. Smith
Kittanning	Clyde W. Cranmer
Kulpmont	J. A. Shovlin (c)
Lancaster	Harvey A. Smith
Lansdale	Ralph R. Smith
Lansdowne	S. N. Ewan, Jr.
Lansford	John E. Lauer
Latrobe	John G. Hulton
Lebanon	John W. Hedge
Lehighton	Bert B. David
Lewistown	C. V. Erdly
Lock Haven	J. F. Puderbaugh
Lower Merion twp. (Address Ardmore)	Frank A. Dubois
Luzerne	T. Stuart Williams (c)
Mahanoy City	H. S. Bolan
Mahanoy twp. (Address Mahanoy City)	Jas. P. Noonan
Mauch Chunk twp. (Address Nesquehoning)	Clayton W. Wotring
McAdoo	Sallie L. Ferry (c)
McKeesport	James H. Lawson
McKees Rocks	W. H. Church
Meadville	Warren P. Norton
Mechanicsburg	E. B. Long
Media	Wm. H. Michaels (c)
Middletown	G. W. Feaser
Midland	W. S. Bazard
Millvale	V. C. Holsinger (c)
Milton	Carl L. Millward
Minersville	C. E. Roudabush
Monessen	A. John Goetz
Monongahela	John H. Dorr
Morrisville	M. R. Reiter (c)
Mount Carmel	G. A. Beierschmitt
Mt. Carmel twp. (Address Locust Gap)	P. J. Burke
Mount Lebanon	H. V. Herlinger
Mount Oliver	A. D. Cleland (c)
Mount Pleasant	J. C. Haberlen
Mount Pleasant twp. (Address Mt. Pleasant)	Lloyd F. Rumbaugh
Muhlenberg twp. (Address Temple)	C. E. Cole
Munhall	Earle O. Liggitt
Nanticoke	A. P. Diffendafer
Nanty-Glo	C. H. Bowers
Nazareth	F. A. Marcks
New Brighton	S. W. Lyons
New Castle	Clyde C. Green
New Kensington	E. T. Chapman
Newport twp. (Address Alden Station)	Andrew E. Rushin
Norristown	H. O. Dietrich
Northampton	G. A. Eichler
North Braddock (Address Braddock)	F. D. Zuerner
North Huntingdon twp. (Address Irwin)	Carl C. Pearsall
Oakmont	W. Lee Gilmore
Oil City	Vaughn R. DeLong
Old Forge	B. T. Harris
Olyphant	John A. Dempsey
Palmerton	J. N. Roeder
Philadelphia	A. J. Stoddard
Phoenixville	Martin L. Peters

City	Superintendent
Pitcairn	R. L. Roose (c)
Pittsburgh	Ben G. Graham
Pittston	Elizabeth Battle
Plains	M. V. Hughes (c)
Plymouth	H. S. Jones
Pottstown	Frank M. Haiston
Pottsville	L. A. BuDahn
Punxsutawney	James T. Downie
Radnor twp. (Address Wayne)	Sydney V. Rowland
Rankin (Address Braddock)	Dennis J. Sullivan
Reading	Thomas Henry Ford
Ridgway	A. C. Nelson
Rochester	Robert P. Barner
Rostraver twp. (Address Belle Vernon, R.D. #1)	Ernest Frank Carter
St. Clair	Charles R. Birch
St. Marys	L. T. Kelly (c)
Sayre	L. E. DeLaney
Schuylkill Haven	Paul S. Christman (c)
Scottdale	S. B. Bulick
Scranton	John H. Dyer
Sewickley	G. C. Cressman (c)
Shamokin	P. E. Whitmeyer
Sharon	W. D. Gamble
Sharpsburg	J. J. Donovan (c)
Sharpsville	Harry E. Pebly (c)
Shenandoah	A. J. Ratchford
South Williamsport	A. B. Elder (c)
Springfield twp. (Address Chestnut Hill)	A. L. Gehman
Steelton	Orris H. Aurand
Stroudsburg	Robert Brown
Summit Hill	E. T. McCready
Sunbury	Ira S. Brinser
Swissvale	C. S. Baily
Swoyerville	Henry R. Horvat (c)
Tamaqua	F. G. Horner
Tarentum	A. D. Endsley
Taylor	W. J. Powell
Throop	John J. O'Hara
Titusville	John H. Linton
Tredyffrin twp. (Address Berwyn)	Wilmer K. Groff
Turtle Creek	W. W. Lantz (c)
Tyrone	Norman Miller
Uniontown	J. N. Mowls
Upper Darby	William C. Sampson
Upper Merion twp. (Address Bridgeport)	Warren A. Cocklin (c)
Vandergrift	John R. Kurtz
Warren	J. G. Rossman
Washington	Meyers B. Horner
Waynesboro	Walter C. Richter
West Chester	G. Arthur Stetson
West Deer twp. (Address Russellton)	Berger Franklin Edlund
West Hazleton	August Martin (c)
West Mahanoy twp. (Address Lost Creek)	Henry F. Murray
West Pittston	R. J. W. Templin
West View	M. J. Horsch (c)
West York	A. H. Martin (c)
Whitehall twp. (Address Egypt)	Clarence M. Gockley
Wilkes-Barre	A. E. Bacon
Wilkinsburg	W. C. Graham
Williamsport	A. M. Weaver
Wilmerding	N. I. Reist (c)
Wilson Boro. (Address Easton)	C. E. Furst
Windber	Joseph L. Hackenberg
Winton Boro. (Address Jessup)	J. L. McCloskey
Yeadon	R. H. Koch
York	A. W. Ferguson

Rhode Island

Barrington	Carl H. Porter-Shirley
Bristol	E. S. Mapes
Burrillville	J. C. Sweeney
Central Falls	James E. Martin
Coventry	R. E. E. Campbell
Cranston	C. W. Bosworth
Cumberland	Bernard F. Norton
East Providence	J. R. D. Oldham
Johnston	Aaron F. DeMoranville
Lincoln (Address Lonsdale)	John L. Smith
Newport	Harold T. Lowe
North Providence	James L. McGuire
Pawtucket	Frank A. R. Allen
Providence	James L. Hanley
South Kingstown	E. K. Wilcox
Warren	Harold D. Chittam
Warwick	Warren A. Sherman
Westerly	Willard H. Bacon
West Warwick	Maisie E. Quinn
Woonsocket	Leon M. Farrin

South Carolina

Aiken	L. K. Hagood
Anderson	E. C. McCants
Camden	J. G. Richards, Jr.
Charleston	A. B. Rhett
Chester	Myron E. Brockman
Clinton	W. E. Monts
Columbia	A. C. Flora
Darlington	J. C. Daniel
Florence	John W. Moore
Gaffney	L. F. Carson
Georgetown	W. C. Bynum
Greenville	J. L. Mann
Greenwood	W. E. Black
Hartsville	J. H. Thornwell
Laurens	C. K. Wright
Newberry	O. B. Cannon
Orangeburg	A. J. Thackston
Rock Hill	W. C. Sullivan
Spartanburg	L. W. Jenkins
Sumter	W. H. Shaw
Union	T. C. Jolly, Jr.

South Dakota

Aberdeen	C. L. Dalthorp
Huron	Andrew J. Lang
Lead	R. V. Hunkins
Mitchell	John C. Lindsey
Rapid City	E. B. Bergquist
Sioux Falls	W. I. Early
Watertown	H. Mackenzie
Yankton	C. A. Beaver

Tennessee

Alcoa	V. F. Goddard
Athens	J. C. Ridenour
Bristol	J. H. Arrants
Chattanooga	W. T. Robinson
Clarksville	C. H. Moore
Cleveland	R. T. Allen
Columbia	J. R. Baker
Dyersburg	C. M. Walker
Elizabethton	E. L. Bowers
Greeneville	Mac Alexander
Jackson	C. B. Ijams
Johnson City	C. E. Rogers
Kingsport	R. N. Robinson
Knoxville	Harry Clark
Memphis	Ernest C. Ball
Morristown	Carl T. Vance
Murfreesboro	J. C. Mitchell
Nashville	W. A. Bass
Paris	W. O. Inman
Shelbyville	Troy G. Young
Springfield	W. M. Overcash
Union City	T. D. Ozment

Texas

Abilene	L. E. Dudley
Amarillo	C. M. Rogers
Austin	A. N. McCallum
Beaumont	E. W. Jackson
Big Spring	W. C. Blankenship
Bonham	I. B. Carruth
Borger	W. A. McIntosh
Breckenridge	N. S. Holland
Brenham	C. M. Selman
Brownsville	E. C. Dodd
Brownwood	E. J. Woodward
Bryan	W. D. Wilkerson
Childress	Chas. E. Damron
Cisco	R. N. Cluck
Cleburne	Emmett Brown
Coleman	C. H. Hufford
Corpus Christi	R. B. Fisher
Corsicana	W. H. Norwood
Crystal City	S. H. Fly
Dallas	N. R. Crozier
Del Rio	Drury Wood
Denison	B. M. McDaniel
Denton	R. C. Patterson
Eagle Pass	F. R. Thompson
Electra	B. M. Dinsmore
El Paso	A. H. Hughey
Ennis	W. F. Howard
Fort Worth	W. M. Green
Gainesville	H. O. McCain
Galveston	S. B. Graham
Goose Creek	Harmon Lowman
Greenville	H. H. Chambers
Harlingen	E. C. Deering
Highland Park	H. E. Gable
Hillsboro	Loy W. Hartsfield
Houston	E. E. Oberholtzer
Huntsville	R. M. Hawkins
Jacksonville	Larue Cox
Kingsville	C. E. Wade
Laredo	W. P. Galligan
Longview	Henry L. Foster
Lubbock	W. B. Irvin
Lufkin	I. A. Coston
Luling	R. A. Box
Marlin	H. J. McIlhany
Marshall	Bryan Dickson
McAllen	John H. Gregory
McKinney	Jack R. Ryan
Mercedes	Ernest H. Poteet
Mexia	Frank L. Williams
Midland	W. W. Lackey
Mineral Wells	W. A. Ross
Mission	H. C. Proctor
Nacogdoches	Rufus E. Price
Navasota	J. T. Ferguson
New Braunfels	E. A. Sahm
Orange	J. W. Edgar
Palestine	Bonner Frizzell
Pampa	L. L. Sone
Paris	A. H. Chamness
Plainview	O. J. Laas
Port Arthur	G. M. Sims
Ranger	W. T. Walton
San Angelo	Felix E. Smith
San Antonio	I. E. Stutsman
San Benito	Grady St. Clair
San Marcos	Fred Kaderli
Seguin	Joe F. Saegert
Sherman	R. L. Speer
Sour Lake	J. L. Johnson
Sulphur Springs	W. L. Willis
Sweetwater	R. S. Covey
Taylor	E. T. Robbins
Temple	Joe R. Humphrey
Terrell	J. E. Langwith
Texarkana	H. W. Stilwell
Tyler	J. M. Hodges
Uvalde	Guy D. Dean
Vernon	C. H. Dillehay
Victoria	P. S. Garner
Waco	R. H. Brister
Waxahachie	T. C. Wilemon
Wichita Falls	H. D. Fillers
Yoakum	G. P. Barron

Utah

Brigham	Hervin Bunderson (a)
Logan	E. Allen Bateman
Murray	James Clove
Ogden	W. Karl Hopkins
Provo	J. C. Moffitt
Salt Lake City	L. John Nuttall, Jr.
Tooele	P. M. Nielsen (a)

Vermont

Barre	Wm. H. Carter
Bennington	H. D. Sylvester
Brattleboro	Florence M. Wellman
Burlington	Lyman C. Hunt
Montpelier	W. A. Kincaid

City	Superintendent
Newport	Homer B. Ashland
Rockingham	Natt B. Burbank
Rutland	W. W. Fairchild
St. Albans	Josiah S. McCann
St. Johnsbury	Frank R. Adams
Springfield	Ernest G. Ham
Winooski	G. R. Stackpole

Virginia

Alexandria	T. C. Williams
Bristol	B. D. French
Charlottesville	James G. Johnson
Clifton Forge	Herman Blankinship
Covington	A. L. Bennett (a)
Danville	G. L. H. Johnson
Fredericksburg	G. H. Brown
Hampton	Robert M. Newton (a)
Harrisonburg	W. H. Keister
Hopewell	R. W. Copeland (a)
Lynchburg	Omer Carmichael
Martinsville	E. E. Givens
Newport News	J. H. Saunders
Norfolk	C. W. Mason
Petersburg	Henry G. Ellis
Portsmouth	Harry A. Hunt
Pulaski	Frank J. Critzer
Radford	F. O. Wygal
Richmond	J. H. Binford
Roanoke	D. E. McQuilkin
South Norfolk	R. H. Pride
Staunton	L. F. Shelburne
Suffolk	S. T. Godbey
Waynesboro	R. C. Jennings
Winchester	G. R. Quarles

Washington

Aberdeen	Edward F. Bloom
Anacortes	De Fore Cramblitt
Bellingham	C. Paine Shangle
Bremerton	Tillman Peterson
Centralia	Paul F. Ferguson
Everett	J. A. Reeves
Hoquiam	H. C. Crumpacker
Kelso	C. H. Lillie
Longview	E. J. McNamara
Olympia	L. P. Brown
Port Angeles	F. W. Breakey
Puyallup	P. B. Hanawalt
Seattle	Worth McClure
Spokane	O. C. Pratt
Tacoma	Howard R. Goold
Vancouver	Paul F. Gaiser
Walla Walla	W. A. Lacey
Wenatchee	W. B. Smith
Yakima	A. C. Davis

West Virginia

Beckley	E. Van Dorsey (a)
Bluefield (Address Princeton)	C. H. Archer (a)
Charleston	Virgil Flinn (a)
Clarksburg	Arthur Upton
Elkins	Bryan Hamilton (a)
Fairmont	J. J. Straight (a)
Grafton	E. G. Kuhn (a)
Hinton	Mrs. Margaret Nicely Leidig (a)
Huntington	O. C. Nutter (a)
Keyser	Paul C. Rouzer (a)
Martinsburg	G. Wm. Ropp (a)
Morgantown	Robert Clark (a)
Moundsville	Louis R. Potts (a)
Parkersburg	John A. Davis, Jr. (a)
Princeton	C. H. Archer (a)
Richwood (Address Summerville)	James L. Creasy (a)
South Charleston (Address Charleston)	Virgil Flinn (a)
Weirton	A. L. Rabenstein
Welch	George W. Bryson (a)
Wellsburg	Olen Rutan (a)
Weston	Robert T. Crawford (a)
Wheeling	J. P. McHenry (a)
Williamson	C. O. Batson (a)

Wisconsin

Antigo	P. A. Tipler
Appleton	Ben J. Rohan
Ashland	George A. Bassford
Baraboo	Gordon L. Willson
Beaver Dam	A. H. Luedke
Beloit	V. F. Dawald
Chippewa Falls	Robert F. Lohrie
Cudahy	J. E. Jones
De Pere	T. J. McGlynn
Eau Claire	Alvin T. Stolen
Fond du Lac	L. P. Goodrich
Fort Atkinson	Frank C. Bray
Green Bay	G. E. Denman
Janesville	V. E. Klontz
Kaukauna	J. F. Cavanaugh
Kenosha	G. F. Loomis
La Crosse	G. M. Wiley
Madison	Philip H. Falk
Manitowoc	Hugh S. Bonar
Marinette	G. E. Watson
Marshfield	E. L. Giroulx
Menasha	F. B. Younger
Menomonie	W. G. Ballentine
Merrill	George F. Brooks
Milwaukee	M. C. Potter
Monroe	E. O. Evans
Neenah	O. F. Hedges
Oconto	L. W. Fulton
Oshkosh	Charles C. Bishop
Portage	A. J. Henkel
Racine	Wm. C. Giese
Rhinelander	W. F. Kruschke
Rice Lake	W. F. Waterpool
Sheboygan	H. E. Smith
Shorewood	H. S. Hemenway
South Milwaukee	John P. Mann
Stevens Point	P. M. Vincent
Superior	W. R. Davies
Two Rivers	Fred G. Bishop
Watertown	R. A. Buell
Waukesha	R. F. Lewis
Waupun	H. C. Wegner
Wausau	E. C. Hirsch
Wauwatosa	W. T. Darling
West Allis	H. B. Nash
Whitefish Bay (Address Milwaukee)	C. L. Mulrine
Wisconsin Rapids	Floyd Smith

Wyoming

Casper	Dean Morgan
Cheyenne	J. L. Goins
Laramie	A. A. Slade
Rock Springs	E. M. Thompson
Sheridan	J. J. Early

References

(a) County superintendent. (b) Parish superintendent. (c) Supervising principal.

SECTION XVII
SUPERINTENDENTS OF CATHOLIC PAROCHIAL SCHOOLS

In the following list the names of the archdioceses and dioceses appear in capitals at the left margin. Archdioceses are asterisked.

DIOCESAN SUPERINTENDENTS OF SCHOOLS

Alabama

MOBILE—Rev. Leo M. Byrnes, Superintendent of Parochial Schools, 400 Government Street, Mobile, Ala.

Arizona

TUCSON—Rev. Willard A. Kinney, Secretary and Chancellor, 192 South Stove Avenue, Tucson, Ariz.

Arkansas

LITTLE ROCK—Very Rev. Msgr. John J. Healy, Diocesan Superintendent of Schools, 2501 State St., Little Rock, Ark.

California

LOS ANGELES *—Rev. Wm. E. North, Ph.D., Diocesan Superintendent of Schools, 714 West Olympic Boulevard, Los Angeles, Calif.

SAN FRANCISCO *—Rev. James H. Long, Diocesan Superintendent of Schools, 50 Oak Street, San Francisco, Calif.

MONTEREY and FRESNO—Rev. James Dowling, M.A., Diocesan Superintendent of Schools, 2820 Mariposa Street, Fresno, Calif.

SACRAMENTO—Rev. Raymond Renwald, Diocesan Superintendent of Schools, Box 1706, Sacramento, Calif.

SAN DIEGO—Rev. Michael J. O'Connor, Diocesan Superintendent of Schools, 1528 Fourth Avenue, San Diego, Calif.

Colorado

DENVER—Rev. M. Hubert Newell, Diocesan Superintendent of Schools, 230 East 17th Avenue, Denver, Colo.

Connecticut

HARTFORD—Rev. Austin Munich, Diocesan Supervisor of Schools, St. Thomas Seminary, Bloomfield, Conn.

Delaware

WILMINGTON—Rev. Leo W. O'Neill, Diocesan Superintendent of Schools, 809 South Broom Street, Wilmington, Del.

Florida

ST. AUGUSTINE—Rt. Rev. P. J. McGill, Chancellor, St. Augustine's Cathedral, St. Augustine, Fla.

Georgia

SAVANNAH-ATLANTA—Rev. T. James McNamara, Diocesan Superintendent of Schools, 222 E. Harris St., Savannah, Ga.

Idaho

BOISE—Rev. J. P. O'Toole, Diocesan Director of Schools, 412 State Street, Boise, Idaho.

Illinois

CHICAGO *—Very Rev. Msgr. D. F. Cunningham, M.A., LL.D., Diocesan Superintendent of Schools, 755 North State Street, Chicago, Ill.

BELLEVILLE—Very Rev. Msgr. John J. Fallon, M.A., Diocesan Superintendent of Schools, 63d and West Main Streets, Belleville, Ill.

PEORIA—Rev. M. J. Haddigan, Diocesan Superintendent of Schools, 405 Smith Street, Peoria, Ill.

ROCKFORD—Rev. William J. Donovan, Diocesan Superintendent of Schools, 95 East Wilson Street, Batavia, Ill.

SPRINGFIELD—Rev. George M. Link, Director of Education, 524 East Lawrence Avenue, Springfield, Ill.

Indiana

FORT WAYNE—Rev. Thomas E. Dillon, Superintendent of Catholic Schools, 903 North Jefferson Street, Huntington, Ind.

INDIANAPOLIS—Rev. Leonard Wernsing, Diocesan Superintendent of Schools, 144 West Georgia Street, Indianapolis, Ind.

Iowa

DUBUQUE *—Rt. Rev. Msgr. John M. Wolfe, Diocesan Superintendent of Schools, 11th and Bluff Streets, Dubuque, Ia.

DAVENPORT—Rev. Richard Egan, Diocesan Superintendent of Schools, 901 Kahl Building, Davenport, Iowa.

DES MOINES—Rev. L. V. Lyons, Diocesan Superintendent of Schools, St. Ambrose Cathedral, Des Moines, Iowa.

SIOUX CITY—Rev. C. Ivis, Diocesan Superintendent of Schools, St. Anthony's Home, Sioux City, Iowa.

Kansas

CONCORDIA—Rev. Michael J. Hogan, Diocesan Superintendent of Schools, St. Mary's Hospital, Manhattan, Kans.

LEAVENWORTH—Rev. William T. C. Boland, Secretary of the School Board, 204 West 8th Street, Topeka, Kan.

WICHITA—Rev. Leon A. McNeill, Diocesan Superintendent of Education, 307 East Central Avenue, Wichita, Kans.

Kentucky

LOUISVILLE *—Rev. Felix Pitt, Ph.D., Secretary of Louisville Catholic School Board, 443 South Fifth Street, Louisville, Ky.

COVINGTON—Rev. Leo J. Streck, Diocesan Superintendent of Schools, St. Joseph's Church, Cold Springs, Ky.

OWENSBORO—Rev. Gilbert Henninger, Chancery Office, 609 East 4th Street, Owensboro, Ky.

Louisiana

NEW ORLEANS *—Rev. Edward C. J. Prendergast, Superintendent of Catholic Schools, 7845 Apricot Street, New Orleans, La.

ALEXANDRIA—Rev. J. E. Howard, Chancellor, 1805 Jackson Avenue, Alexandria, La.

LAFAYETTE—Rt. Rev. Msgr. Anthony F. Isenberg, Diocesan Superintendent of Schools, The Cathedral, Lafayette, La.

Maine

PORTLAND—Rev. John J. Barrett, Diocesan Superintendent of Schools, 307 Congress Street, Portland, Maine.

Maryland

BALTIMORE *—Rev. John I. Barrett, Ph.D., J.C.L., Diocesan Superintendent of Schools, 415 Cathedral Street, Baltimore, Md.

Massachusetts

BOSTON *—Rev. Richard Quinlan, S.T.L., Diocesan Superintendent of Schools, 75 Union Park Street, Boston, Mass.

FALL RIVER—Rev. Edward J. Gorman, M.A., Superintendent of Diocesan Schools, 162 Walnut Street, Fall River, Mass.

SPRINGFIELD—Rev. Dr. John R. Rooney, Diocesan Superintendent of Schools, College of Our Lady of the Elms, Chicopee Falls, Mass.

Michigan

DETROIT *—Rev. Carroll F. Deady, Ph.D., Diocesan Superintendent of Schools, 1234 Washington Boulevard, Detroit, Mich.

GRAND RAPIDS—Rev. E. L. Quaderer, Diocesan Superintendent of Schools, 385 Leonard Street, N. E., Grand Rapids, Mich.

LANSING—Rev. Joseph R. Byrne, Secretary, 233 Seymour Avenue, Lansing, Mich.

MARQUETTE—Rev. Martin Melican, Superintendent of Parochial Schools, Holy Family Orphan's Home, Marquette, Mich.

SAGINAW—Rev. John J. Sonefeld, Chancellor, 124 North Hamilton Street, Saginaw, Mich.

Minnesota

ST. PAUL *—Rev. Roger J. Connole, Ph.D., Diocesan Superintendent of Schools, 240 Summit Avenue, St. Paul, Minn.

CROOKSTON—Rev. Victor Miller, Diocesan Superintendent of Schools, St. Joseph's Church, Ada, Minn.

DULUTH—Rev. Martin P. Larkin, Superintendent of Catholic Schools, 610 99th Avenue W., Duluth, Minn.

ST. CLOUD—Rev. T. Leo Keaveny, Ph.D., Diocesan Superintendent of Schools, Cathedral Rectory, 316 Seventh Avenue N., St. Cloud, Minn.

WINONA—Rev. R. W. Bartholome, Diocesan Director of Confraternity of Christian Doctrine, St. Mary's Hospital, Rochester, Minn.

Mississippi

NATCHEZ—Rev. D. J. O'Beirne, Chancellor, Bishop's House, 107 South Union Street, Natchez, Miss.

Missouri

ST. LOUIS—Very Rev. James P. Murray, Superintendent of Parish Schools, 2709 Clara Avenue, St. Louis, Mo.

KANSAS CITY—Rev. John J. Murphy, Diocesan Superintendent of Schools, 1310 Westport Road, Kansas City, Mo.

ST. JOSEPH—Rev. Joseph W. Helmes, Ph.D., Director of Charities, 519 10th Street, St. Joseph, Mo.

Montana

GREAT FALLS—Rev. John E. Regan, Chancellor, 1611 2nd Avenue North, Great Falls, Mont.

HELENA—Rev. J. A. Rooney, M.A., S.T.L., Diocesan Superintendent of Schools, 1306 North Main Street, Walkerville, Mont.

Nebraska

GRAND ISLAND—Rev. Anthony E. Egging, Diocesan Superintendent of Schools, St. Elizabeth's Hospital, Lincoln, Nebr.

LINCOLN—Very Rev. Msgr. L. V. Barnes, B.A., Diocesan Superintendent of Schools, 514 South 18th Street, Lincoln, Nebr.

OMAHA—Rev. Joseph H. Ostdiek, Diocesan Superintendent of Schools, 2507 Cass Street, Omaha, Nebr.

Nevada

RENO—Very Rev. Robert J. Harrigan, Chancellor and Secretary, P. O. Box 1050, Reno, Nev.

New Hampshire

MANCHESTER—Rev. William P. Clancy, D.D., Diocesan Superintendent of Schools, Mt. St. Mary's Academy, Hooksett, N. H.

New Jersey

NEWARK *—Very Rev. Msgr. Wm. F. Lawlor, LL.D., Diocesan Superintendent of Schools, 31 Mulberry Street, Newark, N. J.

CAMDEN—Rev. Wm. J. Hickey, Diocesan Superintendent of Schools, 10 North Myrtle Street, Vineland, N. J.

PATERSON—Rev. Walter H. Hill, Diocesan Superintendent of Schools, 24 De Grasse Street, Paterson, N. J.

TRENTON—Rev. Richard T. Crean, 153 North Warren Street, Trenton, N. J.

New Mexico

SANTA FE *—Rt. Rev. Msgr. A. Estvelt, P.A., V.C., Socorro, N. Mex.

New York

NEW YORK *—Rev. William R. Kelly, M.A., Diocesan Superintendent of Schools, 23 East 51st Street., New York, N. Y.

ALBANY—Rev. James P. Hanrahan, M.A., Superintendent of Parish Schools, 695 Fifth Avenue, Watervliet, N. Y.

BROOKLYN—Rt. Rev. Msgr. Joseph V. S. McClancy, Diocesan Superintendent of Schools, 75 Greene Avenue, Brooklyn, N. Y.

BUFFALO—Rev. John W. Peel, Superintendent of Parochial Schools, 793 Elk Street, Buffalo, N. Y.

OGDENSBURG—Rt. Rev. Msgr. John M. Hogan, Diocesan Superintendent of Schools, 218 Hamilton Street, Ogdensburg, N. Y.

ROCHESTER—Rev. John M. Duffy, Diocesan Superintendent of Schools, 50 Chestnut Street, Rochester, N. Y.

SYRACUSE—Rev. David C. Gildea, M.A., J.C.L., S.T.B., Diocesan Superintendent of Schools, 257 E. Onondaga Street, Syracuse, N. Y.

North Carolina

RALEIGH—Rev. Michael J. Begley, Diocesan Superintendent of Schools, Wrightsville, N. C.

BELMONT ABBEY NULLIUS—Rev. Thomas Oestreich, O.S.B., S.T.D., Chancellor, Belmont, N. C.

North Dakota

BISMARCK—Rev. Bonaventure Goebel, O.S.B., Chancellor, St. Alexius Hospital, Bismarck, N. Dak.

FARGO—Rev. William T. Mulloy, Diocesan Superintendent of Schools, 723 Kittson Avenue, Grafton, N. Dak.

Ohio

CINCINNATI *—Rev. Carl J. Ryan, Ph.D., Diocesan Superintendent of Schools, 28 Calhoun Street, Cincinnati, Ohio.

CLEVELAND—Rt. Rev. Msgr. John R. Hagan, Ph.D., Diocesan Superintendent of Schools, 621 N. B. C. Building, Cleveland, Ohio.

COLUMBUS—Rt. Rev. Msgr. John J. Murphy, Diocesan Superintendent of Schools, 1651 East Main Street, Columbus, Ohio.

TOLEDO—Rev. Norbert M. Shumaker, Ph.D., Diocesan Superintendent of Catholic Schools, 807 Superior Street, Toledo, Ohio.

Oklahoma

OKLAHOMA CITY and TULSA—Rev. J. B. Dudek, Chancellor, 1000 North Lee Avenue, Oklahoma City, Okla.

Oregon

PORTLAND *—Rev. Wm. S. Scandlon, C.S.C., Diocesan Superintendent of Schools, 2053 S. W. 6th Avenue, Portland, Ore.

BAKER CITY—Rev. John D. Lee, Diocesan Superintendent of Schools, Baker, Ore.

Pennsylvania

PHILADELPHIA *—Rt. Rev. Msgr. John J. Bonner, D.D., LL.D., Superintendent of Parochial Schools, 19th and Wood Streets, Philadelphia, Pa.

ALTOONA—Rev. Francis McNelis, Diocesan Superintendent of Schools, 511 20th Street, Altoona, Pa.

ERIE—Rev. Joseph J. Wehrle, S.T.D., Superintendent of Catholic Schools, 225 West 9th Street, Erie, Pa.

HARRISBURG—Rev. Harold E. Keller, Diocesan Superintendent of Schools, 22nd and Market Streets, Harrisburg, Pa.

PITTSBURGH—Rev. Thomas Quigley, Diocesan Superintendent of Schools, 5115 Second Avenue, Pittsburgh, Pa.

SCRANTON—Rev. J. J. Featherstone, M.A., J.C.L., Diocesan Superintendent of Schools, 315 Wyoming Avenue, Scranton, Pa.

Rhode Island

PROVIDENCE—Rev. Thomas V. Cassidy, M.A., S.T.L., Diocesan Superintendent of Schools, 25 Fenner Street, Providence, R. I.

South Carolina

CHARLESTON—Rt. Rev. Joseph L. O'Brien, Diocesan Superintendent of Schools, 136 St. Philip Street, Charleston, S. C.

South Dakota

RAPID CITY—Rev. Michael T. Costigan, Chancellor, 1622 West Boulevard, Rapid City, S. Dak.

SIOUX FALLS—Rt. Rev. Msgr. W. S. O'Meara, Diocesan Superintendent of Schools, Watertown, S. Dak.

Tennessee

NASHVILLE—Rev. George J. Flanigen, Diocesan Superintendent of Schools, 328 Fifth Avenue N., Nashville, Tenn.

Texas

SAN ANTONIO *—President of the School Board, 230 Dwyer Avenue, San Antonio, Texas.

AMARILLO—Rev. Newton T. Miller, Chancellor, 1110 Washington Street, Amarillo, Texas.

CORPUS CHRISTI—Rev. James H. Kelly, Diocesan Superintendent of Schools, P. O. Box 284, Rockport, Texas.

DALLAS—Rev. Thomas S. Zachry, Diocesan Superintendent of Schools, 2215 Ross Avenue, Dallas, Texas.

EL PASO—Very Rev. J. C. M. Garde, Chancellor, 1012 North Mesa Avenue, El Paso, Texas.

GALVESTON—Rt. Rev. Jacob Schnetzer, Diocesan Superintendent of Schools, 4015 Sherman Avenue, Houston, Texas.

Utah

SALT LAKE—Rev. Thomas F. Butler, Diocesan Superintendent of Schools, 650 S. 11th East Street, Salt Lake City, Utah.

Vermont

BURLINGTON—Very Rev. William P. Crosby, President of the School Board, 7 Fullerton Avenue, Montpelier, Vt.

Virginia

RICHMOND—Rev. Francis J. Byrne, Diocesan Superintendent of Schools, 811 Cathedral Place, Richmond, Va.

Washington

SEATTLE—Rev. Edward J. McFadden, Diocesan Superintendent of Schools, 907 Terry Avenue, Seattle, Wash.

SPOKANE—Rev. Roy E. Thelen, Chancery Office, 1115 West Riverside Avenue, Spokane, Wash.

West Virgina

WHEELING—Rev. John J. O'Brien, Superintendent of Parochial Schools, 464 Washington Avenue, Clarksburg, W. Va.

Wisconsin

MILWAUKEE *—Rev. Edmund J. Goebel, Diocesan Superintendent of Schools, 625 North Milwaukee Street, Milwaukee, Wis.

GREEN BAY—Rev. E. J. Westenberger, Ph.D., Diocesan Superintendent of Schools, 128 South Monroe Street, Green Bay, Wis.

LA CROSSE—Rev. Lester W. Seemann, Diocesan Superintendent of Schools, 3222 South Avenue, La Crosse, Wis.

SUPERIOR—Rev. Joseph Annabring, Diocesan Superintendent of Schools, 1201 Hughitt Avenue, Superior, Wis.

Wyoming

CHEYENNE—Rev. James A. Hartmann, Chancellor, Box 497, Cheyenne, Wyo.

SECTION XVIII

AIDS AVAILABLE TO LOCAL SCHOOL BOARDS FROM STATE DEPARTMENTS

PARTICIPATION OF STATE AGENCIES IN PLANNING AND SUPERVISING LOCAL SCHOOL-BUILDING DEVELOPMENT

IN the planning of buildings for a public school system, it frequently is desirable to know the degree to which the state board of education has provided for participation and cooperation. The following summary segregates the character of the supervision given by the state and its representative agencies under three headings. The first item indicates the action which the state board may be expected to take. The second item shows the part played by the state superintendent of schools as the official spokesman for the state department of education. In the third part will be found indications of the assistance or guidance which other state agencies will give. The form of tabulation has necessitated very brief statements covering these responsibilities, but the degree and character of participation are clearly shown for each state. The list has been revised up to December, 1939.

THE STATES' PARTICIPATION IN SCHOOL-BUILDING CONSTRUCTION

Alabama

State Board of Education, Montgomery
Approves rules and regulations submitted by state superintendent.
State Superintendent of Education, A. H. Collins
Prepares and submits to the state board of education rules and regulations pertaining to: operation of state minimum program; minimum standards for school sites; minimum standards for plans, specifications, and construction of school buildings; for the issuance of warrants for capital outlay purposes. Recommends school legislation to Legislature.
Schoolhouse planning is a service in the division of administration and finance. In addition to the preparation of rules and regulations as listed above, the following services are rendered:
Plans and specifications are prepared for rural school building construction.
Plans and specifications prepared by private architects are approved.
Buildings in process of construction are inspected upon request to determine whether plans and specifications are being followed.
Rules and regulations of the state board are administered to insure the proper execution.
School surveys set up a practicable long-time program for locating school centers, for school-building construction and maintenance, for tax districts, for school finance, for capital outlay debt service, for safe and adequate school transportation where needed, for the teaching personnel, for child accounting, and for record keeping. The state institutions of higher learning cooperate in furnishing trained and experienced consultants on survey work. No capital outlay expenditures can be made except at school centers approved by the survey program. The school-building program is determined in terms of the curriculum, road conditions, public school fund, and transportation which may be made available.
Each county is required to submit annually a building and capital outlay program which must be approved before actual work on the program is undertaken.
Director of the Division of Administration and Finance, E. L. Johns
Supervisor of Research and Surveys, A. R. Meadows
Supervisor of Schoolhouse Planning, R. E. Ledbetter
Architect, Clyde C. Pearson

Arizona

State Board of Education, Phoenix
No jurisdiction whatever in regard to buildings erected by districts.
State Superintendent of Public Instruction, H. E. Hendrix
No jurisdiction.
Other Agencies
Board of health issues regulations.

Arkansas

State Board of Education, Little Rock
Has a division of school grounds and schoolhouse planning.
Director prepares plans for 1- to 7-teacher buildings, and for such buildings as teachers' homes, shops, home economics buildings, gymnasiums, etc.
Furnishes preliminary sketches of floor plans for larger buildings.
Checks architects' plans for school buildings upon request.
Advises school officials as to plans for remodeling, repairing and altering school buildings.
Advises superintendents and teachers as to interior arrangements, furniture and equipment.
Superintends the construction of all school buildings during progress of erection, except when the district employs an architect.
State Commissioner, T. H. Alford
No legal provision for approval.
Director, School Plant Division

California

State Superintendent of Public Instruction, Walter F. Dexter, Sacramento
Division of schoolhouse planning passes on all plans costing more than $5,000, excepting those in the largest cities; is called into consultation by city districts, and controls other situations by surveys.
Site sizes and locations controlled by state standards.
School sites may not be purchased in non-city districts until written report and recommendation made by Division of Schoolhouse Planning (1939).
No building contract, in situations coming under the department's jurisdiction, is legal without the required approval.
This department does not make a practice of furnishing working drawings.
Chief of Division of Schoolhouse Planning, Dr. Charles W. Bursch

Colorado

State Superintendent of Public Instruction, Mrs. Inez Johnson Lewis, Denver
School building handled by local boards of education.

Connecticut

State Board of Education, Hartford
Has a section of buildings and plans which approves plans for enlargement and new construction. It inspects school buildings for safety.
Publishes standards for guidance of local boards.
Has architect to whom plans are referred.
Assists local communities in building surveys.
State Commissioner, A. G. Grace
Assistant Supervisor of Buildings and Plans, John E. Nichols

Delaware

State Board of Education, Dover
Outside Wilmington prepares a tentative program of school building to submit to local boards.
Hears comments and suggestions thereon.
Creates standards with effect of law, governing hygienic, sanitary, and protective construction; selection, arrangement, and maintenance of sites; condemns school buildings.
Has approval of plans and specifications.
State Superintendent of Public Instruction, Dr. H. V. Holloway
Building Program
There has been no appropriation of funds under the above for the last few years.
Other Agencies
Legislature has created a state school-building act.
There is a state school-building account.
State school-building commission for each district.
Plans approved by state board of education and commission.
Buildings built by commission.
Construction supervised by commission.
Board of health has to approve drinking water and sewage disposal.

Florida

State Board of Education, Tallahassee
Prescribes rules and regulations and minimum standards in the field.
State Superintendent of Public Instruction, Colin English
Has oversight, charge, and management of all matters pertaining to public schools, school buildings and grounds.
The state department renders the following services:
1. In cooperation with county boards of public instruction, carries on surveys to determine where elementary and secondary school centers should be located, the steps that should be taken in carrying out the building program, and the means of financing the building program.
2. All capital outlay projects are submitted along with the annual school budget. Advice is rendered in connection with these proposals.
3. All plans for school buildings to be constructed are submitted to the department for approval. When necessary, recommendations are given relating to desirable improvements in the plans.
4. Plans are prepared for some of the buildings where architectural services are not available. Consultative and advisory services relating to the letting of contracts and other problems involved in the planning and construction of school buildings are provided through this department.

Director of Administration and Finance, Edgar L. Morphet
Has direction of Division, which includes work in surveys, transportation, school plant planning, and architectural service.
School Plant Planning Service, J. L. Graham
School Architect, James A. Stripling
School Surveys and Transportation, T. George Walker

Georgia

State Superintendent of Schools, Dr. M. D. Collins, Atlanta
Furnishes plans and specifications for school-building guidance in local units.
Supervisor of schoolhouse construction prepares plans for 1- to 6-teacher buildings; prepares school ground plans; checks architects' plans; advises school officials.
Other Agencies
County superintendent and county board of education approve plans.

Idaho

State Board of Education, Boise
Standardization of:
Sanitary appliances
School furniture
School equipment and supplies
School buildings
Issues plans for 1-, 2-, 3-room buildings.
Requires approval of all plans.
State Superintendent, J. W. Condie
Member of state board of education and its executive officer.
Other Agencies
Department of public welfare has to cooperate with state board of education in its duties regarding schools.
County superintendent has power to require local trustees to conform to rules of state board "if there is money enough."
County board of health is responsible for sanitation in schools.

Illinois

State Superintendent of Public Instruction, John A. Wieland, Springfield
Prepares, with advice of state board of health, state architect, and state fire marshal, specifications for minimum requirements in heating, ventilation, lighting, seating, water supply, toilets, safety against fire.
These have force of law.
Other Agencies
State architect is required to assist the state superintendent of schools.
Enforcement of law is in the hands of county superintendents and local authorities.
County superintendent advises school officials in details of construction, but only on standards is it necessary to follow him.
County superintendent inspects buildings.
Board of directors and board of education required to submit plans to county superintendent.

Indiana

State Superintendent of Public Instruction, Floyd I. McMurray, Indianapolis
Other Agencies
Local school trustees erect buildings. Plans and specifications must be submitted to state board of health for approval of sanitation and hygiene; to state board of accounts for adequacy of specifications and fair competition; and to state fire marshal for compliance with state fire laws.
State board of health issues standards.

Iowa

State Superintendent of Public Instruction, Jessie M. Parker, Des Moines
Shall prepare and publish, when deemed necessary, a pamphlet containing suitable plans and specifications.

Kansas

State Board of Education, Topeka
"No provision in the laws to prevent the erection of undesirable buildings or to compel the discontinuance of buildings that should be abolished immediately, further than plans for all new school buildings must be submitted to the state architect as to provision for fire protection according to law." Section 367, Revised School Laws of Kansas for 1937.
Has adopted standardization of rural schools involving among other things: out-building; school-building equipment; and the school building itself.
State Superintendent of Public Instruction, Geo. L. McClenny
Criticizes and approves plans submitted voluntarily by local authorities.
State Architect, Row W. Stookey

Kentucky

State Board of Education, Frankfort
Authorized to approve and adopt regulations for the sanitary and protective construction of public school buildings.
State Superintendent of Public Instruction, John W. Brooker
With concurrence of state board of health prepares regulations for the sanitary and protective construction of public school buildings. Prepares plans and specifications for 1- to 4-teacher public school buildings, for adoption by the state board of education. Examines and approves or disapproves plans and specifications submitted by county boards of education and graded boards of education.
Director of School Buildings and Grounds

Louisiana

State Superintendent of Public Education, T. H. Harris, Baton Rouge
The state law requires approval of all school plans by the state superintendent. Plans must be drawn by licensed school architects.
Other Agencies
The state law requires that the school plans shall be approved by the state board of health, fire marshal, and parish school board.

Maine

State Commissioner of Education, Bertram E. Packard, Augusta
No school building can be built or repaired without his approval, where the expenditure is in excess of $500.
Provides plans for 1- to 4-room buildings free of cost.
Issues minimum requirements so that local units will be able to meet his approval of plans.

Other Agencies
No school building can be built or repaired without approval of board of health, where the expenditure is in excess of $500.

Maryland

State Board of Education, Baltimore
Elementary schools. Standardization includes grounds, buildings, lighting, heating and ventilation, library, equipment.
Has issued "Standards for School Buildings" as a guide to county superintendents.
State Superintendent of Schools, Dr. Albert S. Cook
Sites and plans for buildings and additions must be submitted to him for approval.
After plans have been approved by the state consultant architect, the state superintendent issues certificate without which no building costing $300 or more can be erected (Sec. 30, Article 77, Annotated Code of Maryland).
Other Agencies
Plans must be submitted to state board of health for approval of sewage-disposal arrangements and plumbing.

Massachusetts

State **Department of Education, Boston**
Acts in an advisory rather than supervisory capacity.
State Commissioner of Education, Walter F. Downey
Assistants of superintendent do much in consulting with local committees. Loan slides.
Other Agencies
Department of Public Works issues school-bus regulations.
Department of Public Safety issues regulations.
Department of Mental Health (through clinics, examines children who are retarded in mental development).
Department of Public Welfare (social worker visits physically handicapped children and submits recommendation as to home instruction).
Department of Public Health co-operates in preparation of forms for test cards, blanks, etc., for physical examination of school children.
Director of Buildings' Inspection Division, Department of Public Safety, J. J. Carey, State House, Boston

Michigan

State Department of Public Instruction, Lansing
Provides consultation to boards of education and school administrators regarding surveys, legal procedures, finance, and educational designing.
Assists in planning and executing building program, upon invitation.
State Superintendent, Eugene B. Elliott
Other Agencies
State fire marshal cooperates for elimination of fire hazards.
State department of health cooperates for provision of proper sanitation.
Public debt commission assists in problems of debt service.

Minnesota

State Board of Education, St. Paul
Prints and distributes laws and rules governing public school buildings and sites.
Supplies inspection service and advises local school officials relative to school building problems in heating, ventilation, illumination, alteration, operation, maintenance, and financing.
Assists architects and public school officials in functional planning of school buildings.
Prepares and supplies gratis to school boards plans and specifications for one and two room school houses.
Examines all plans and specifications with power of approval or otherwise.
Prescribes rules for schoolhouse construction, including therein rules of the board of health relative to sanitary standards for toilets, water-supply, and disposal of sewage.
May condemn school buildings and sites unfit or unsafe for use as such.
State Commissioner, John Gunderson Rockwell
Other Agencies
Division of sanitation, state board of health, examines and approves all school-building plans relative to water supply, sewage disposal and plumbing systems.
The law authorizes county superintendent to advise rural school boards in regard to buildings, ventilation, and school grounds.
Director, Division of Buildings and Business Administration, I. O. Friswold.

Mississippi

State Department of Education, Jackson
Has a division of school building service. This division:
Cooperates in making surveys on the effective organization of schools.
Makes surveys to determine building needs.
Outlines building programs.
Approves architects' plans and specifications for school buildings.
Furnishes free plans and specifications for some small school buildings, teachers' homes and accessory buildings.
General advisory service on school-plant planning and equipment and on the effective use of the school plant.
State Superintendent, J. S. Vandiver
School Building Service, W. G. Eckles, State Director

Missouri

State Superintendent of Education, Jefferson City
Provides standards for schoolhouse planning, provides plans for one-, two-, and three-room buildings, makes surveys and sets up educational specifications for buildings to be erected, checks and approves plans and specifications, also contracts let, provides school-building insurance surveys, and maintains a state-wide system of janitorial training schools.
State Superintendent of Public Schools, Lloyd W. King
Other Agencies
The State Department of Public Health aids in checking the water supply.
Director of School Building Service, N. E. Viles

Montana

State Board of Education, Helena
Publishes a bulletin containing a list of standards for rating 1- and 2-room schools.
State Superintendent of Public Instruction, Ruth Reardon
Plans are furnished local boards by the board of health.

Nebraska

State Superintendent of Public Instruction, Charles W. Taylor, Lincoln
Advises with school authorities regarding building programs when officials request conferences. The state department does not maintain technically trained people for this service, and Nebraska has no law requiring construction according to specifications.

Nevada

State Department of Education, Carson City
Must prepare plans and specifications for rural schoolhouses on standard lines of school architecture as to size, lighting, heating, ventilation and general sanitation. The trustees of rural schools needing new schoolhouses shall be supplied with such plans and specifications upon request.
No public schoolhouse may be erected in any school district until the plans have been approved by the deputy superintendent of public instruction.
State Superintendent of Public Instruction, Miss Mildred Bray

New Hampshire

State Board of Education, Concord
State Commissioner, James N. Pringle
Interprets meaning of "suitable and sanitary" buildings for all schools. Has general authority to make regulations. Co-operates with superintendents and local school boards in planning buildings.
Recommends to state board of health investigation of unsuitable buildings.
Administrative Field Agent, Paul E. Farnum
Other Agencies
State board of health, on complaint, may condemn or order buildings improved at expense of districts.

New Jersey

State Board of Education, Trenton
Advice and consent to appointment of building inspector by commissioner of education.
Approves plans and specifications for all schoolhouse construction.
Has set up a school building code.
State Commissioner of Education, Dr. Charles H. Elliott
Appoints an inspector of school buildings, with advice and consent of state board of education.
May instruct county and city superintendents as to constructing schoolhouses and furnishing them.
Assistant Commissioner of Education, Charles D. Anderson
Supervisor of school buildings.
Inspector of School Buildings, Seymour Williams
Recommends approval of plans and specifications for schoolhouse construction.
Inspects all new construction and old buildings.
Advises local school officials on school building needs.
Assists in school building surveys.

Other Agencies
County superintendent has power to inspect the condition of schoolhouses, sites, etc., and to advise with local boards in respect to construction, heating and ventilation, and lighting. May, with consent of commissioner of education, cause state moneys to be withheld where facilities are not in accord with legal requirements.
Local boards provide school buildings.

New Mexico

State Board of Education, Santa Fe
Approves minimum building standards to be followed by the director in charge of approval for all school building plans.
Gives official approval to proposed bond issues.
Other Agencies
State health officials make reports to the education department whenever undesirable health conditions are discovered.
State Superintendent of Public Instruction, Mrs. Grace J. Corrigan
Director, Division of Instruction in Charge of Building Plans Approval, L. W. Clark

New York

State Education Department, Albany
Has a division of school buildings and grounds with a director.
Has set up standards.
Board issues a pamphlet of information for local authorities.
Makes inspections of sites and school conditions before definite action is taken by local authority.
Advises with superintendents, principals, and boards in regard to needs and best way to meet them.
Examines preliminary plans.
State Commissioner, Dr. Frank P. Graves
All plans and specifications must receive the commissioner's approval in all districts other than first and second class cities.
He cannot approve unless plans conform to laws.
No tax can be levied until plans are approved.
Director of School Buildings and Grounds Division, Gilbert L. Van Auken

North Carolina

State Board of Education, Raleigh
Has a division of schoolhouse planning.
There is a Literary Loan Fund from which loans are made when plans are approved.
Suggestions for planning school plants are distributed from time to time by state department of public instruction.
Has plans for one-story schools and gymnasiums which are distributed free by director of schoolhouse planning.
State Superintendent of Public Instruction, Clyde A. Erwin
Law requires that all plans be approved by state superintendent of public instruction.
Other Agencies
State insurance commissioner for fire safety, and state board of health for sanitary facilities.
Director, Division of Schoolhouse Planning, W. F. Credle

North Dakota

State Superintendent of Public Instruction, Arthur E. Thompson, Bismarck
Plans must be submitted to and approved by superintendent.

Ohio

State Director of Education, E. N. Dietrich, Columbus
Other Agencies
Has a state building code (very elaborate).
All plans must be approved by chief inspector of workshops and factories, except in cities having regularly organized building inspection departments.
District health commissioner checks plans for water-supply and sanitary arrangements. State department of health may make surveys and issue orders as to these matters.

Oklahoma

State Superintendent of Public Instruction, A. L. Crable, Oklahoma City
Prepares complete plans and specifications when requested for the construction of school buildings for four teachers or less, costing less than $10,000.
Makes school-building survey for all sizes of buildings.
Approves plans of all sizes but approval is not required by law.
Other Agencies
Standard building laws.
Book of 300 plans in hands of each county superintendent in the state.
Director of Schoolhouse Planning, Frank Williams

Oregon

State Superintendent of Public Instruction, Rex Putnam, Salem
Manual on "The Construction and Care of School Buildings" issued to all school districts. No legal provision for the approval of the state department, but an advisory service is maintained.
Other Agencies
Plans for schools in third-class districts must be approved by county school superintendents.
County superintendents advise with the school boards relative to the construction, warming, ventilating, and arrangement of schoolhouses.
All schools are examined periodically by representatives from the State Department of Education and county school superintendents.
All buildings are inspected periodically by the State Fire Marshal.

Pennsylvania

State Department of Public Instruction, Harrisburg
Has a division of school buildings.
Prescribes rules and regulations and makes such recommendations as it may deem expedient to promote physical and moral welfare of school children.
Department code—
Required to approve plans in 2nd, 3rd, 4th class districts.
Supervises preparation of plans in local communities.
Submits suggestive sketches.
State Superintendent of Public Instruction, Dr. Francis B. Haas
Other Agencies
State code.
Art commission passes on architectural design.
Department of labor and industry passes on fire and panic protection.
Chief, Division of School Plant, Dr. HuBert C. Eicher

Rhode Island

State Director of Education, James F. Rockett, Providence
Part of the income of the permanent school fund may be apportioned by the director of education to assist towns in constructing model school buildings.

South Carolina

State Superintendent of Education, Dr. James H. Hope, Columbia
Division of schoolhouse planning and construction. Plans must be submitted to and approved by the director of schoolhouse planning.
The director inspects all plans and new buildings, and a certificate of approval is necessary before they can be used.
Plans and specifications and supervision of construction are furnished to small schools not employing an architect.
Other Agencies
Has a state building code.
Director of Schoolhouse Planning, S. P. Clemons

South Dakota

State Superintendent of Public Instruction, J. F. Hines, Pierre
Plans must be approved by him, and show heating and ventilation scheme. He assists in an advisory capacity in the planning of school buildings; he also helps boards in various ways to show their communities the needs of new buildings and additions to buildings.

Tennessee

State Commissioner of Education, B. O. Duggan, Nashville
Division of schoolhouse planning furnishes working drawings and specifications for buildings up to and including four-teacher buildings. The division offers functional planning advice, and checks plans for larger buildings, where such service is requested.
State Director of Schoolhouse Planning, H. C. Headdon

Texas

State Board of Education, Austin
Purchases school district bonds or grants waiver for district to sell in open market.
State Superintendent, L. A. Woods
Administrative officer of public school laws and ex-officio secretary of the state board, receives reports required by statute and is general superintendent of business relating to the public schools.
Other Agencies
School-building code.

Plans must be submitted as follows for approval: (1) in a common school district—to the county superintendent; (2) independent district and city or town—to superintendent of schools.

These agencies report to state department what they have done and transmit evidence.

State Director of School Plant Division, J. Fred Horn

Prepares plans for 1- to 6-teacher buildings, and suggestive sketches for larger buildings; advises school officials; checks architects' plans; makes school-building surveys upon invitation; visits local units upon invitation.

Utah

State Board of Education, Salt Lake City

There are two department building codes.

First is in abeyance though not exactly discarded.

They have operated under the second one 7 years.

State Superintendent of Public Instruction, C. H. Skidmore

Where the expenditure is in excess of $5,000, his approval of plans and specifications is required before construction may be undertaken.

Is required to formulate a code to govern preparation of plans by local communities.

May hire an architect to examine plans or inspect buildings and where necessary shall make recommendations for conformity to code.

Vermont

State Department of Education, Montpelier

Public school buildings are standardized with "points" on buildings, grounds, equipment.

Plans "should be" submitted to state department.

Issues plans, pictures and bulletins.

Employs a full-time draftsman to prepare plans and specifications for rural communities without charge.

Provides for follow-up work during the period of construction.

State Commissioner, Francis L. Bailey

Other Agencies

Plans "must be" submitted to board of health.

Virginia

State Board of Education, Richmond

Has a Division of School Buildings.

Prepares plans and specifications for school divisions on request.

Supervises construction free of charge.

Minimum standards have been set up and approved.

Cooperates with local boards in:

(a) Long-range studies of school building programs.
(b) Preparing preliminary plans and estimates.
(c) Developing working drawings and specifications and landscaping plans.
(d) Attendance at openings of proposals.
(e) Supervision of construction, including periodic inspections.

State Superintendent of Public Instruction, Sidney B. Hall

State Director, Division of School Buildings, Raymond V. Long

Washington

State Superintendent of Public Instruction, Olympia

Has been given "some power" through law on "wider use of school plant."

State Superintendent of Public Instruction, Stanley F. Atwood

Other Agencies

County superintendents approve plans in 3rd class districts.

West Virginia

State Board of Education, Charleston

May require all plans and specifications for the erection of school buildings to comply with the requirements of law; and may require all county boards to submit all plans and specifications for the state board's approval.

State Superintendent of Free Schools, W. W. Trent

Wisconsin

State Department of Public Instruction, Madison

Under a cooperative agreement between the industrial commission and the department, all school plans are sent to the latter by the commission for checking and suggestive criticisms looking towards the erection of first-class buildings.

Helps local communities by suggesting plans for all types of buildings to serve as a basis for extended work by commercial architects.

Service has been extended to cover expert advice on heating, ventilation, lighting.

The department develops complete plans and specifications and gives architectural service for 1- and 2-room rural schools on request.

Inspects all types of schools with a view to improving housing conditions and facilities; makes complete building surveys in all types of communities on request.

Gives field service and makes inspection upon request.

Cooperates with all state agencies which have partial jurisdiction (through codes) over school buildings.

State Superintendent of Public Instruction, John Callahan

Other Agencies

The law requires submission of all school plans to industrial commission. This checking refers primarily to the application of the state building code and pays attention primarily to construction, safety and sanitation.

Supervisor of School Building Service, H. W. Schmidt

Wyoming

State Superintendent of Public Instruction, Esther L. Anderson, Cheyenne

Entrusted with general supervision of the public schools of the state.

Commissioner of Education, Ray E. Robertson

He shall prepare for the use and guidance of the district board regulations and suggestions for standardizing and grading schools and for the hygienic and sanitary building of schoolhouses and the selection of sites.

ARCHITECTS FOR EDUCATIONAL BUILDINGS

(*Continued from page 176*)

South Dakota

Aberdeen

Roland R. Wilcken, Citizens Bldg.

Mitchell

Walter J. Dixon, Medical Arts Bldg.

Rapid City

Chenoweth & Forrette, Elks Bldg.
James C. Ewing, 609½ St. Joe

Sioux Falls

Hugill & Blatherwick, Boyce Greeley Bldg.
Perkins & McWayne, Paulton Bldg.
Harold Spitznagel, Western Surety Bldg.

Tennessee

Bristol

R. V. Arnold, 602 Shelby St.

Chattanooga

Wm. Crutchfield & H. G. Law, 809 Pine St.
Selmon T. Franklin, Chattanooga Bank Bldg.
R. H. Hunt Co., Chattanooga Bank Bldg.
Clarence T. Jones, James Bldg.
Gordon L. Smith, Volunteer Bldg.

Clarksville

Speight & Hibbs

Johnson City

D. R. Beeson, Sells Bldg.
Leland K. Cardwell

Kingsport

Allen N. Dryden, Improvement Bldg.

Knoxville

Barber & McMurry, 517½ W. Church Ave.
Manley & Young, 609 W. Main St.

Memphis

George Awsumb, 1792 Forrest Ave.
Furbringer & Ehrman, Union Planters Bank Bldg.
Hanker & Heyer, Commerce Title Bldg.
Walk C. Jones—Walk C. Jones, Jr., Shrine Bldg.
Estes W. Mann, Inc., Shrine Bldg.
Walter R. Nelson, 2115 Monroe Ave.
Regan & Weller, Commerce-Title Bldg.

Nashville

Asmus & Nevins, Nashville Trust Bldg.
Dougherty, Clemmons & Seale, Third National Bank Bldg.
Thos. W. Gardner, Amer. Trust Bldg.
Hart & Russell, Third National Bank Bldg.
Granbery Jackson, Jr., Vendome Bldg.
Marr & Holman, Stahlman Bldg.
McKissack & McKissack, Morris Memorial Bldg.
Eli M. Tisdale, Warner Bldg.

Texas

Abilene

David S. Castle Co.
Gaskill-McDaniel, Alexander Bldg.

Alpine

Victor J. Smith, 906 College Ave.

Amarillo

Macon O. Carder, Fisk Bldg.
Guy A. Carlander, Box 3158
Emmett F. Rittenberry & Son, Fisk Bldg.
J. Roy Smith, Blackburn Bldg.
Townes & Funk, 1208 W. 10th St.

Austin

Olin Boese, 128 W. 7th St.
Driscoll & Groos, 801 Park Place
Giesecke & Harris, 504 W. 7th St.
Bubi Jessen and Wolf Jessen, 112 E. 9th St.
H. F. Kuehne, Littlefield Bldg.
C. H. Page & Son, Gracy Bldg.
Page & Southerland, Nalle Bldg. Annex
Robert Leon White, University of Texas

Beaumont

Wallace B. Livesay, Box 2228
N. E. Wiedemann, American National Bank Bldg.

Brenham

Travis Broesche

Bryan

Atkinson & Sanders, Parker Bldg.

Cameron

J. E. Johnson

College Station

Ernest Langford

Corpus Christi

Brock, Roberts & Anderson, Jones Bldg.
Hamon & Co., Jones Bldg.
Nat W. Hardy, Nixon Bldg.
Morris L. Levy, Med. Prof. Bldg.
Westfall & Wade, Nixon Bldg.

Corsicana

Blanding & Horn, Mays Bldg.

Dallas

Geo. D. Anderson, Gulf States Bldg.
Arthur A. Brown
Ralph Bryan, Construction Bldg.
Christiansen & Christiansen, Thomas Bldg.
Eugene Davis, Liberty Bank Bldg.
Griesenbeck & Danna, Construction Bldg.
Lang & Witchell, First National Bank Bldg.
La Roche and Dahl, Southland Life Annex
C. H. Leinbach & Bros., Slaughter Bldg.
Mark Lemmon, Tower Petroleum Bldg.
Walter C. Sharp, Construction Bldg.
Arthur E. Thomas, Construction Bldg.

El Paso

Frazer & Benner, El Paso National Bank Bldg.
Percy McGhee, F. N. B. Bldg.
Gilbert G. Satrong, First National Bank Bldg.
Trost & Trost, El Paso National Bank Bldg.

Fort Worth

W. G. Clarkson & Co., First National Bank Bldg.
Preston M. Geren, 806½ Burnett St.
Wyatt C. Hedrick, Inc., First National Bank Bldg.
C. M. Love & Co., 314 S. Henderson St.
M. M. Moseley, 4223 Pershing St.
Elmer G. Withers Architectural Co., Inc., Mid-Continent Bldg.
Clyde H. Woodruff, 2217 Irwin Ave.

Galveston

Ben Milam, Trust Bldg.

Goose Creek

L. L. Huie, Box 475

Henderson

J. L. Downing, First National Bank

Houston

Lamar Q. Cato, 500 Stuart Ave.
Cameron Fairchild, Houston Merchants Exchange Bldg.
Alfred C. Finn, Bankers Mortgage Bldg.
Louis A. Glover, 3415 Houston St.
Hedrick & Lindsley, Inc., Sterling Bldg.
Blum E. Hester, M. & M. Bldg.
Henry F. Jonas & Tabor, Union National Bank Bldg.
Moore & Lloyd, 2503 Westheimer St.
Joseph W. Northrop, Jr., 3940 Main St.
Harry D. Payne, 3908 Main St.
R. G. Schneider & Co., Inc., 911 Stuart Ave.
Henry Aam Stubee, 3908 S. Main St.
Maurice J. Sullivan, 3901 Travis St.
Wm. Ward Watkins, 5009 Caroline St.
Wirtz & Calhoun, 500 Stuart Ave.

Jasper

W. C. Meador, Box 603

Livingston

Emory S. White, First National Bank Bldg.

Longview

N. L. Peters, Glover-Crim Bldg.
Zimmerman & Morgan, First National Bank Bldg.

Lubbock

D. L. Knapp, Box 1584
Haynes & Strange, Myrick Bldg.
O. R. Walker, Palace Theatre Bldg.

Marshall

Stanley Brown

Palestine

T. Brook Dougherty, 201½ N. Spring St.
O. L. Hazelwood, Link Bldg.
Theo. S. Maffitt, 510 N. Sycamore St.

Paris

Will H. Lightfoot
Edwin R. Smith, S. Main St.

Port Arthur

J. Earle Neff, Box 1105
Nolan Stewart, Box 415

Rosenburg

Ernest L. Shult

San Angelo

John G. Becker, 203 Western Reserve Bldg.
L. H. Gaskins, 123 Allen St.
Leonard R. Mauldin & Max D. Lovett, 111 W. Beauregard St.

San Antonio

Atlee B. & Robert M. Ayres, Smith-Young Tower
Leo M. J. Dielmann, 145 North St.
Will N. Noonan, Builders Exchange Bldg.
Phelps & Dewees & Simmons, Majestic Bldg.

Sweetwater

Don W. Smith, Doscher Bldg.

Tyler

Gregory & Cates, Gary Bldg.
Shirley Simons, Citizens Bank Bldg.
Birch D. Easterwood & Son, Liberty Bldg.

Wichita Falls

Voelcker & Dixon, Inc.

Utah

Logan

Karl C. Schaub & Son

Ogden

Hodgson & McClenahan, Eccles Bldg.
Eber F. Piers, 2726 Harrison Ave.

Provo

Claude Shepherd Ashworth, 44 W. 2nd St., N.
Joseph Nelson, 135 E. Center St.

Salt Lake City

James E. Allen & Pope & Burton, Newhouse Bldg.
Ashton & Evans, Beneficial Life Bldg.
Cannon & Mullen, Templeton Bldg.
Fetzer & Fetzer, Templeton Bldg.
Miles E. Miller, Felt Bldg.
Scott & Welch, Dooly Bldg.
Ware & McClenahan, Utah Savings & Trust Bldg.

Vermont

Burlington
Austin & Austin, 240 College St.
Rutland
Arthur H. Smith, Gryphon Bldg.

Virginia

Charlottesville
Louis A. Brown, Jr., National Bank Bldg.
Lynchburg
Pendleton S. Clark, Krise Bldg.
Hinnant & Smith, Peoples Bank
Newport News
Williams, Coile & Pipino, Melson Bldg.
Norfolk
Rudolph, Cooke & Van Leeuwen, Arcade Bldg.
Richmond
Baskerville & Son, Central National Bank Bldg.
Carneal, Johnston & Wright, 6th & Main Sts.
Raymond V. Long, State Board of Education
J. Binford Walford, 103 E. Cary St.
Marcellus Wright & Son, 1103 E. Main St.
Roanoke
Eubank & Caldwell, Inc., Boxley Bldg.
Rudolph Frantz & John M. Thompson, Boxley Bldg.
Frank F. Stone, 110½ W. Church Ave.
Smithey & Boynton, 112 W. Kirk Ave.

Washington

Aberdeen
Clarence W. George, Becker Bldg.
Charles A. Haynes, Aberdeen Savings & Loan Bldg.
Bellingham
Leonard W. Bindon, Medical Bldg.
F. Stanley Piper, Herald Bldg.
Wohleb & Stanton, Herald Bldg.
Longview
Ray V. Weatherby, Henry Bldg.
Pullman
Stanley A. Smith, State College of Washington
Seattle
Bebb & Jones, Hoge Bldg.
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Earl W. Morrison, Textile Tower
Naramore & Brady, Central Bldg.
Fred B. Stephen, Smith Tower
Arch N. Torbitt, Lloyd Bldg.
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Miller & Hovind, Old National Bank Bldg.
G. A. Pehrson, Old National Bank Bldg.
George M. Rasque & Son, Washington Trust Bank Bldg.
Whitehouse & Price, Hutton Bldg.
Tacoma
E. J. Bresemann, Perkins Bldg.
Mock & Morrison, Perkins Bldg.
Chas. V. Rueger, Puget Sound Bank Bldg.
Sutton, Whitney & Dugan, W. R. Rust Bldg.
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Donald J. Stewart, Central Bldg.
Yakima
John W. Maloney, Larson Bldg.

West Virginia

Bluefield
Garry & Sheffey, Appalachian Bldg.
Alex B. Mahood
Charleston
M. M. Konarski
Herbert S. Kyle, Union Trust Bldg.
Walter F. Martens, Chamber of Commerce Bldg.
Meanor & Handloser, Inc., Payne Bldg.—Lee St.
Hugh Miller Associates, Inc., Chamber of Commerce Bldg.
Tucker & Silling, Masonic Bldg.
Clarksburg
E. C. Holmboe, Empire Bldg.
Edward J. Wood & Son, Associates, Lowndes Bldg.
Fairmont
L. D. Schmidt, Professional Bldg.
Huntington
Levi J. Dean, 2748 Geyan Ave.
Frampton & Bowers, 412 11th St.
Keyser
Frank Austin Hersh, 55 N. Main St.
Parkersburg
William F. Miller, Citizens Bank Bldg.
Welch
Hassell T. Hicks
Wheeling
Frederick Faris, 1117 Chapline St.

Wisconsin

Amery
E. F. Klinger, Box 192
Appleton
Raymond N. LeVee, 117 E. College Ave.
Boscobel
Joseph G. Durrant
Eau Claire
Howard M. Nelson, S. A. F. Bldg.
Fond du Lac
F. J. Stepnoski & Son, 104 S. Main St.
Green Bay
Gordon Feldhausen, 1464 Elm St.
Foeller, Schober & Berners, 310 Pine St.
Levi A. Geniesse, 226 N. Washington St.
Oppenhamer & Obel, 110 S. Washington St.
La Crosse
Boyum, Schubert & Sorenson, Hoeschler Bldg. (also in Winona, Minn.)
Nelson & Fuchs, 115 S. 4th St.
Parkinson & Dockendorff, Linker Bldg.
Madison
Beatty & Strang, 610 State St.
Philip M. Homer, 21-23 W. Main St.
Law, Law & Potter, First Central Bldg.
Frank Riley & Lewis Siberz, 103 W. Mifflin St.
Starck, Sheldon & Schneider, Inc.
Edward Tough, 119 E. Washington Ave.
Manitowoc
Smith & Brandt, Dempsey Bldg.
Marinette
Max Hanisch, Stephenson Bldg.
Marshfield
Gus. A. Krasin, 202½ S. Central Ave.
Milwaukee
E. Brielmaier & Sons Co., 735 N. Water St.
Brust & Brust, 135 W. Wells St.
Clas & Clas, Inc., 759 N. Milwaukee St.
Gerrit J. deGelleke, 152 W. Wisconsin Ave.
Ebling & Plunkett, 739 N. Broadway
Eschweiler & Eschweiler, 720 E. Mason St.
Lindl, Schuette & Lefebvre, 709 N. 11th St.
R. A. Messmer & Bro., 231 W. Wisconsin Ave.
Richard Philipp, 707 N. Broadway
Alfred H. Siewert, 2309 N. 36th St.
Guy E. Wiley, 2213 N. 34th St.
Oshkosh
Auler, Jensen & Brown, E. R. A. Bldg.
Racine
J. Mandor Matson, Baker Block
Sheboygan
E. A. Stubenrauch, 809 N. 8th St.
Two Rivers
Sylvester Schmitt, Bank of Two Rivers Bldg.
Wauwautosa
Mark F. Pfaller, 8525 Ravenswood Circle
Wisconsin Rapids
A. F. Billmeyer & Son, 172 2nd St.
Donn Hougen, 132 E. Grand Ave.

Wyoming

Casper
Goodrich & Krusmark, Zuttermeister Bldg.
Cheyenne
William DuBois, 1810 Capitol Ave. (also in Laramie)
Frederick H. Porter, 211 W. 19th St.
Laramie
Wm. Dubois & Fred W. Ambrose (also in Cheyenne)
G. C. Hollo, 208 Grand Ave.

Alaska

Juneau
N. Lester Troast & Associates, Shattuck Bldg. (also at Anchorage)

Hawaii

Honolulu
C. W. Dickey, Damon Bldg.
Hart Wood & Arthur J. Russell, 2512 Manoa Road.
John Mason Young, Merchant and Bethel Sts.

Canada

Calgary, Alta.
W. A. Branton, Calgary School Board,
Charlottetown, P. E. I.
Jas. E. Harris, Hughes Bldg.
Halifax, N. S.
C. A. Fowler & Co., Capitol Bldg.
A. E. Priest, 428 Robie St.
Montreal, Que.
Featherstonhaugh & Durnford, University Tower Bldg.
Edward J. Turcotte, Dominion Square Bldg.
Ottawa, Ont.
W. C. Beattie, 66 Craig St.
Lucien Leblanc, 45 Rideau St.
Quebec, Que.
Pierre Levesque, 115 St. John St.
Regina, Sask.
Van Egmond & Storey, McCallum Hill Bldg.
St. Catharines, Ont.
Lionel A. Hesson, 309 St. Paul St.
St. Hyacinthe, Que.
G. René Richer, 242 Girouard St.
St. John, N. B.
H. Claire Mott, 13 Germain St.
Sherbrooke, Que.
Louis N. Audet, 32 Wellington St., N.
J. Aimé Poulin, 63 Prospect St.
Toronto, Ont.
Allward & Gouinlock, 57 Bloor St., W.
S. B. Coon & Son, 4 St. Thomas St.
Craig & Madill, 62 Charles St., E.
Marani, Lawson & Morris, 46 Bloor St., W.
Vancouver, B. C.
Harold Cullerne, 325 Howe St.
H. W. Postle, Board of School Trustees, 590 Hamilton St.
Sharp & Thompson, 626 Pender St., W.
Victoria, B. C.
Henry Whittaker, Parliament Bldg.
Wolfville, N. S.
Leslie R. Fairn

AMERICAN SCHOOL PUBLISHING CORP.

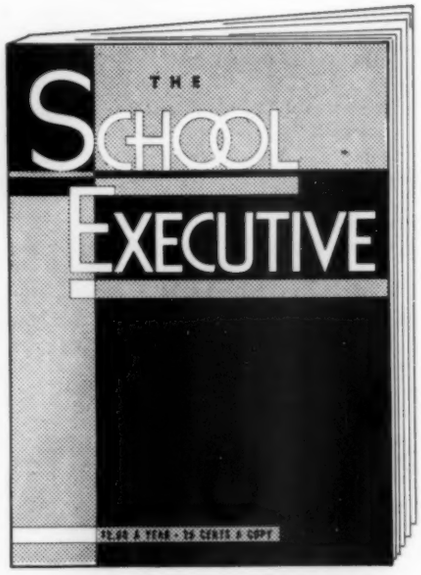
470 Fourth Avenue
New York, N. Y.

"The School Executive's Own Magazine"—for School Superintendents, Principals and Members of School Boards

THE SCHOOL EXECUTIVE is brimming over with helpful ideas on school administrative practices, bringing to school executives each month something of **value,** something **new.**

There are all sorts of school publications—but THIS ONE has the merit of being devoted **exclusively** to **the school executive.** Its twofold aim is to give him:

1. practical help on at least some of the many problems which confront him—by reporting how other executives have tackled, or are endeavoring to solve, the same or similar problems;
2. stimulating ideas from educators all over the country.



Lively—Articles in THE SCHOOL EXECUTIVE are short and meaty. Illustrations are used liberally, because photographs, cartoons, drawings and diagrams often tell the story better than words.

Practical—THE SCHOOL EXECUTIVE presents concrete, usable information and advice from up-and-coming school executives, saving its readers many a wasted hour, many a potential headache, many a misspent dollar.

Informative—Since no school executive has time to attend **all** the school conventions, or to read **all** the periodicals, new books and pamphlets and newspaper items relating to educational matters, the Editors of THE SCHOOL EXECUTIVE endeavor to cull out of this enormous mass of material whatever seems to them most important in educational ideas, practices and trends, weeding out the commonplace articles and items that take much time to read while adding little or nothing to one's fund of knowledge.

Comprehensive—THE SCHOOL EXECUTIVE runs the entire gamut of the executive's concerns—from broad questions of educational policy to specific problems of supervision, school finance and school equipment.

An Ever-Present Aim in the Minds of the Editors of THE SCHOOL EXECUTIVE:—

To present each idea, report or story as briefly and attractively as possible consistent with adequate treatment of the subject under consideration.

Just as a teacher must cultivate the habit of presenting her subject matter in a way that will interest the pupils, THE SCHOOL EXECUTIVE Editors are constantly striving to serve their platterfuls of ideas each month in as appetizing a form as possible, for SCHOOL EXECUTIVE readers.

The School Equipment News Section of THE SCHOOL EXECUTIVE

One of the many responsibilities of a school executive is to keep well informed on the various types of equipment used in school buildings and on school grounds—equipment such as will effectively and adequately cope with the many-sided needs and functions of the modern school.

For this reason, two years ago THE SCHOOL EXECUTIVE added a new section, entitled **School Equipment News,** which reports on whatever is **new,** and whatever seems to be **best,** in school equipment—from floor mops to roofing materials; from schoolroom gadgets that add to the classroom efficiency to portable or stationary bleachers to add to the pupils' enjoyment and, incidentally, to the gate receipts.

This section is being scanned thoroughly each month by a large and ever-increasing number of school administrators.

To any school superintendent, principal or school board member not already familiar with THE SCHOOL EXECUTIVE we shall be glad to send a free sample copy upon request. Address THE SCHOOL EXECUTIVE, 470 Fourth Avenue, New York.

Subscription rates: one year $2.00; two years $3.00; three years $4.00

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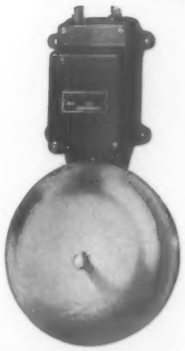
Electrically and Mechanically Operated Fire Alarm Systems
Electric Bells and Signals



Liberty Vibrating Bells Are of the Plunger Hammer Type. Nos. 6-Jr. D. C. and 7-Jr. A. C. Are Made in 3″, 4″, 5″ and 6″ Sizes, and Nos. 6 D. C. and 7 A. C. in 6″, 8″, 10″, 12″ and 14″ Sizes

Nos. 86 D. C. and 87 A. C. Combination Vibrating and Mechanical Bells Are Especially Adapted for Fire Signals. They Are Made in 8″, 10″ and 12″ Sizes

Nos. 811 D. C. and 812 A. C. Combination Single Stroke and Mechanical Bells Are Also Adapted for Fire Signals. They Are Made in 6″, 8″, 10″ and 12″ Sizes

PRODUCTS

Manually Operated Fire Alarm Systems;

Electrically and Mechanically Operated Fire Alarm Systems;

Vibrating and Single Stroke Bells for Direct or Alternating Current;

Combination Electrical and Mechanical Bells;

Aluminum Grids to fit all sizes of Bells;

Steel Housings for all sizes of Bells.

THOMAS-SMITH FIRE ALARM SYSTEM FOR SCHOOLS

(Illustrated at Right)

This manual fire alarm system for schools is approved by architects and conforms with state codes. It is the only system having a rigid rod connecting the alarms on the different floors of the school buildings. Other constructive features are:

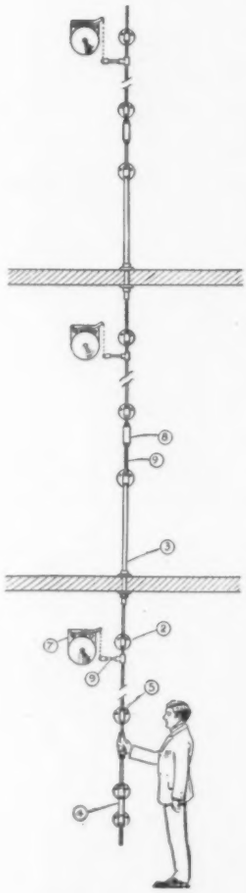
1. Supports are adjustable to take care of uneven walls or misalignment of succeeding floors.
2. The floor tube is adjustable, to allow for floors of various thicknesses, and it extends up from the floor to prevent any obstruction in operation.
3. The spring is totally enclosed and positive in action.
4. All supports and tubes are bushed with brass, lacquered.
5. Finish is enamel. Colors, red, black or buff.
6. The bells are the best made.
7. The handles are of polished brass, lacquered.
8. The operating rod is a continuous steel tube, operating gongs on all floors simultaneously.
9. Wood mats are supplied for mounting supports and gongs.

Combination electrical and mechanical bells can be furnished with above fire alarm systems for operation with electrical ringing systems.

THOMAS-SMITH LIBERTY BELLS

Thomas-Smith Liberty Bells cover all types and sizes from 4-inch to 20-inch, vibrating or single stroke, 110 volt, 220 volt, all standard transformer voltages, battery operations, direct or alternating current. All Thomas-Smith Liberty Bells embody the very finest workmanship and materials. Thomas-Smith Aluminum Grids are made to fit all sizes of bells. They fit snugly at the base of the mechanism over the shell and are bird-proof.

Write for catalog of Thomas-Smith Fire Alarm Systems and Liberty Bells.



Liberty Single Stroke Bells, Nos. 12 A. C. and 11 D. C. Made in 5″ to 14″ Sizes. Bells Contain no Springs Nor Moving Parts Except Plunger

MUTSCHLER BROTHERS COMPANY

Nappanee, Indiana

SAMSON
Tables for the Classroom, Library, Office and Cafeteria.

PORTA-BILT PLANNED KITCHENS
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42 x 30″	1	Four 2¼″ solid	1½″
48 x 30″	1	Four 2¾″ box	1½″
54 x 30″	1	Four 2¾″ box	1½″
60 x 34″	2	Four 3″ box	1½″
72 x 36″	2	Four 3″ box	1½″
96 x 48″	2	Four 3¾″ box	1¾″
120 x 48″	2	Five 3¾″ box	1¾″
144 x 48″	2	Five 3¾″ box	1¾″
168 x 48″	2	Six 3¾″ box	1¾″
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SECTION XIX

CLASSIFIED INDEX TO MANUFACTURERS' PRODUCTS

Absorbent Papers & Specialties
Eaton-Dikeman Co., 511

Acoustical Materials
Armstrong Cork Co., 69
Celotex Corp., 89-91
Johns-Manville, 86-88
Lovit Co., 92-94
Wood Conversion Co., 95

Adding Machines
Remington Rand Inc., 381-388
Underwood Elliott Fisher Co., 416, 417

Address Systems (see Public Address Systems)

Air Conditioning
John J. Nesbitt, Inc., 108
B. F. Sturtevant Co., 109

Air Driers, Electric
Chicago Hardware Foundry Co., 116

Alcohol Concentrators
Barnstead Still and Sterilizer Co., Inc., 510

Aluminum Castings
Oliver Machinery Co., 543

Ammeters & Voltmeters (see Meters, Electric)

Ammonia, Aqua & Anhydrous
Mathieson Alkali Wks., 284
Pennsylvania Salt Manufacturing Co., 285

Amplifiers
DeVry Corp., 344
General Radio Co., 523
Graybar Electric Co., 128
RCA Mfg. Co., Inc., 325-340
Western Electric Co., 350, 351

Annunciators
Connecticut Telephone & Electric Corp., 127

Asbestos Products
Johns-Manville, 86-88

Asphalt
Barrett Co., 97
Socony-Vacuum Oil Co., Inc., 238
Texas Co., 100

Asphalt Mastic Floors
United Laboratories, Inc., 214

Asphalt Planking
Servicised Products Corp., 78

Asphalt Shingles
Barrett Co., 97

Asphalt Tile Flooring
Johns-Manville, 86-88
Thos. Moulding Floor Mfg. Co., 77
Tile-Tex Co., 65-68

Athlete's Foot Preventive
American Playground Device Co., 288, 289
Hillyard Sales Co., 196, 197
Midland Chemical Laboratories, 200, 201
Pennsylvania Salt Manufacturing Co., 285
West Disinfecting Co., 204, 205

Athletic Equipment
American Playground Device Co., 288, 289
Anchor Post Fence Co., 239
Atlas Portable Bleachers, 278
Benjamin Electric Co., 272, 273
Cincinnati Time Recorder Co., 135
Crouse-Hinds, 276
Everwear Mfg. Co., 290
General Electric Co., 124; 274, 275; 320; 515-518
International Business Machines Corp., 140, 141
Leavitt Corp., 279
Fred Medart Mfg. Co., 280; 411
Mitchell Mfg. Co., 291; 360
Pittsburgh-Des Moines Steel Co., 281
Recreation Equipment Co., 292
Stewart Iron Works Co., 244
Universal Bleacher Co., 282
Warren Telechron Co., 139
Westinghouse Electric & Mfg. Co., 123; 277
Wickwire Spencer Steel Co., 245

Athletic Timers
Cincinnati Time Recorder Co., 135
International Business Machines Corp., 140, 141
Warren Telechron Co., 139

Audiometers (for Testing Hearing)
Graybar Electric Co., 128
Western Electric Co. (Distributed by Graybar Electric Co.), 350, 351

Audiphones (for the Hard of Hearing)
Western Electric Co., 350, 351

Auditorium Lighting (see Lighting Equipment)

Autoclaves
F. J. Stokes Machine Co., 512

Automatic Sprinkler Systems
Rockwood Sprinkler Co., 144, 145

Automatic Telephone Systems (see Telephone Systems)

Backstops, Tennis Court, Baseball and Basketball
Anchor Post Fence Co., 239
Colorado Fuel & Iron Corp., 240
Cyclone Fence Co., 242
Everwear Mfg. Co., 290
Fred Medart Manufacturing Co., 280; 411
Recreation Equipment Co., 292
W. F. Robertson Steel & Iron Co., 243
Stewart Iron Works Co., 244
Wickwire Spencer Steel Co., 245

Balopticons
Bausch & Lomb Optical Co., 345; 513

Band Saws
Delta Mfg. Co., 542
Oliver Machinery Co., 543
Walker-Turner Co., 545
Yates-American Machine Co., 540, 541

Banquet Tables
Brewer-Titchener Corp, 365

Barbed Wire
Continental Steel Corp., 241

Baseboard, Metal
B & T Floor Co., 80, 81
Milcor Steel Company, 104, 105

Basket Ball Equipment
Anchor Post Fence Co., 239

Baskets, Fibre
National Vulcanized Fibre Co., 420

Baskets, Wire Gymnasium
Durabilt Steel Locker Co., 400, 401

Bath Tubs
Crane Co., 117

Bathroom Cabinets
Miami Cabinet Div., Philip Carey Co., 468, 469

Bathroom Fixtures
Miami Cabinet Div., Philip Carey Co., 468, 469

Baths, Chemists' Laboratory
General Ceramics Co., 507
Maurice A. Knight, 508

Baths, Shower
Crane Co., 117

Batteries, Electric Storage
Thomas A. Edison, Inc., 521
Electric Storage Battery Co., 143; 522

Beds & Bedding
Doehler Metal Furniture Co., Inc., 461-464
Simmons Co., 466, 467
Nathan Straus-Duparquet, Inc., 486
Universal Equipment Co., 465

Bells, Electrical & Mechanical
Connecticut Telephone & Electric Corp., 127
Holtzer-Cabot Electric Co., 136-138; 524
International Business Machines Corp., 140, 141
Thomas-Smith Co., 603

Benches, Campus (see Settees)

Benches, Locker Room
Durabilt Steel Locker Co., 400, 401

Benches, Manual Training
Lyon Metal Products, Inc., 410
New Britain Machine Co., 548
Oliver Machinery Co., 543

Benches, Saw
Delta Mfg. Co., 542
Oliver Machinery Co., 543
Walker-Turner Co., 545

Bicycle Racks
American Playground Device Co., 288, 289
Recreation Equipment Co., 292

Binoculars
Bausch & Lomb Optical Co., 345; 513
Spencer Lens Co., 346; 514

Blackboard Cleaners
Hild Floor Machine Co., 208, 209
Hillyard Sales Co., 196, 197
Midland Chemical Laboratories, Inc., 200, 201
Selig Co., 202, 203

Blackboard Slate
Bolger-Heller Slate Co., 158
Natural Slate Blackboard Co., 154

Blackboard Trim and Crayon Troughs
Art Metal Construction Co., 389-396
Loxit Co., 156, 157
Milcor Steel Company, 104, 105

Blankets
Nathan Straus-Duparquet, Inc., 486

Bleachers and Grandstands
Atlas Portable Bleachers, 278
Leavitt Corp., 279
Pittsburgh-Des Moines Steel Co., 281
Universal Bleacher Co., 282
Williams Iron Works, Inc., 283

Blowers, Organ
Spencer Turbine Co., 215

Blowers, Turbo Compressor
Spencer Turbine Co., 215

Blueprint Washing Tanks & Wringers
Wickes Bros., 550

Blueprinting Machines, Continuous
Wickes Bros., 550

Boards, Bulletin and Directory
Acme Bulletin & Directory Board Corp., 483
Akins Sales Co., Inc., 167
Art Metal Construction Co., 389-396
Congoleum-Nairn Inc., 70, 71
Remington Rand Inc., 381-388
Tablet & Ticket Co., 367

Bodies, School Bus
International Harvester Co., 566
Superior Coach Corp., 564, 565

Boiler Compounds
Midland Chemical Laboratories, Inc., 200- 201

Book Binding Materials
E. I. Du Pont De Nemours & Co., Inc., 622, 623

Book Cases & Cabinets
All-Steel-Equip Co., 398
Art Metal Construction Co., 389-396
Berger Mfg. Div., Republic Steel Corp., 125; 399
Doehler Metal Furniture Co., 461-464
Durabilt Steel Locker Co., 400, 401
General Fireproofing Co., 402, 403; 502, 503
Globe-Wernicke Co., 404, 405
Metal Office Furniture Co., 406, 407
Remington Rand Inc., 381-388
Security Steel Equipment Corp., 408, 409

Book Racks
All-Steel-Equip Co., Inc., 398
Art Metal Construction Co., 389-396
Durabilt Steel Locker Co., 400, 401
General Fireproofing Co., 402, 403; 502, 503
Globe-Wernicke Co., 404, 405
Lyon Metal Products, Inc., 410
Remington Rand Inc., 381-388
Security Steel Equipment Corp., 408, 409
Yawman and Erbe Mfg. Co., 397

Bookkeeping Machines
Remington Rand Inc., 381-388
Underwood Elliott Fisher Co., 416, 417

Books (see Textbooks)

Boxes, Metal, Shop
All-Steel-Equip Co., Inc., 398
General Fireproofing Co., 402, 403; 502, 503
Lyon Metal Products, Inc., 410
Fred Medart Manufacturing Co., 280; 411

Boxes, Steel Transfer
All-Steel-Equip Co., Inc., 398

Bread Slicers
Hobart Mfg. Co., 481
Oliver Machinery Co., 543
John E. Smith's Sons Co., 482
Nathan Straus-Duparquet, Inc., 486

Bridges, Electric
General Radio Co., 523

Broilers, Electric
Edison General Electric Appliance Co., 476

Broilers, Gas
Standard Gas Equipment Corp., 477

Bronze Tablets
Akins Sales Co., Inc., 167
General Bronze Corp., 149
James H. Matthews & Co., 161
Stewart Iron Works Co., 244

Brushes
Hillyard Sales Co., 196, 197
J. I. Holcomb Mfg. Co., 198, 199
Selig Co., 202, 203

Bubbler Heads
Crane Co., 117

Building Papers
Barrett Co., 97
Servicised Products Corp., 85

Built-Up Roofing
Barrett Co., 97
Ruberoid Co., 99
Servicised Products Corp., 85
Texas Co., 100

Bulletin Boards (see Boards, Bulletin)

Buses
International Harvester Co., 566
Superior Coach Corp., 564, 565

Cabinets, Bathroom
Miami Cabinet Div., Philip Carey Co., 468, 469

Cabinets, Filing
Art Metal Construction Co., 389-396
Berger Mfg. Div., Republic Steel Corp. 125; 399
General Fireproofing Co., 402, 403; 502, 503
Globe-Wernicke Co., 404, 405
Metal Office Furniture Co., 406, 407
Remington Rand Inc., 381-388
Security Steel Equipment Corp., 408, 409
Yawman and Erbe Mfg. Co., 397

Cabinets, Key
Durabilt Steel Locker Co., 400, 401
P. O. Moore, Inc., 162, 163

Cabinets, Kitchen
Bacon and Vincent Co., 445-452
Excel Metal Cabinet Co., Inc., 444
Whitehead Metal Products, 453-460

Cabinets, Museum (see Cases, Museum & Display)

Cabinets, Phonograph Record
RCA Mfg. Co., Inc., 325-340

Cabinets, Special (X-Ray, Film, etc.)
Art Metal Construction Co., 389-396
Berger Mfg. Div., Republic Steel Corp, 125; 399
Capitol Stage Lighting Co., 353-360
Doehler Metal Furniture Co., 461-464
General Fireproofing Co., 402, 403; 502, 503
Globe-Wernicke Co., 404, 405
Neumade Products Corp., 324

Cabinets, Storage
All-Steel-Equip Co., Inc., 398
Art Metal Construction Co., 389-396
Berger Mfg. Div., Republic Steel Corp., 125; 399
Doehler Metal Furniture Co., Inc., 461-464
Durabilt Steel Locker Co., 400-401
General Fireproofing Co., 402, 403; 502, 503
Globe-Wernicke Co., 404, 405
Lyon Metal Products, Inc., 410
Fred Medart Manufacturing Co., 280; 411
Metal Office Furniture Co., 406, 407
Remington Rand Inc., 381-388
Security Steel Equipment Corp., 408, 409
Yawman and Erbe Mfg. Co., 397

Cabinets, Type
American Type Founders, 547

Cafeteria Equipment
Aluminum Cooking Utensil Co., 478
S. Blickman, Inc., 485
G. S. Blodgett Co., Inc., 473
Chelsea Products, 484
Cleveland Range Co., 474
Crucible Steel Co. of America, 475
Doehler Metal Furniture Co., Inc., 461-464
Edison General Electric Appliance Co., 476
Hobart Mfg. Co., 481
Mutschler Brothers Co., 604
John E. Smith's Sons Co., 482
Standard Gas Equipment Corp., 477
Nathan Straus-Duparquet, Inc., 486
John Van Range Co., 487
R. Wallace & Sons Mfg. Co., 480

Cafeteria Furniture (See Furniture, Cafeteria)

Cafeteria Supplies
John Sexton & Co., 488

Calcimines
Muralo Co., Inc., 213

Calcium Chloride
Columbia Alkali Corp., 237
Pennsylvania Salt Manufacturing Co., 285
Solvay Sales Corp., 286

Calculating Machines
Remington Rand Inc., 381-388

Calipers
Brown & Sharpe Mfg. Co., 538, 539

Cameras, Motion Picture
Bell & Howell Co., 342
DeVry Corp., 344
RCA Mfg. Co., Inc., 325-340
Victor Animatograph Corp., 343

Canned Foods
John Sexton & Co., 488

Carbon Paper
Miller-Bryant-Pierce Co., 419
Underwood Elliott Fisher Co., 416, 417

Card Systems
Art Metal Construction Co., 389-396
Remington Rand Inc., 381-388

Cases, Museum & Display
Art Metal Construction Co., 389-396
General Fireproofing Co., 402, 403; 502, 503
Globe-Wernicke Co., 404, 405
Laboratory Furniture Co., 505
Metal Office Furniture Co., 406, 407
Remington Rand Inc., 381-388
Yawman and Erbe Mfg. Co., 397

Cash Registers
Remington Rand Inc., 381-388

Casters
Bassick Co., 364; 470
Faultless Caster Corp., 471

Caulking Compounds
Athey Co., 150, 151
A. C. Horn Co., 191-194
United Laboratories, Inc., 214

Ceilings, Steel
Milcor Steel Company, 104, 105

Cement
A. C. Horn Co., 191-194

Cement (Acid-Proof)
Pennsylvania Salt Manufacturing Co., 285

Cement Sealers & Finishers
American Crayon Co., 195

Central Heating Systems, Conduit for
American District Steam Co., 101
Ric-wiL Co., 103

Centralized Radio Receiving Equipment
Holtzer-Cabot Electric Co., 136-138; 524
International Business Machines Corp., 140, 141
RCA Mfg. Co., Inc., 325-340
Western Electric Co., 350, 351

Chair Glides (Noiseless) & Casters
Bassick Co., 364; 470
Buckeye Glide Co., Inc., 472
Faultless Caster Corp., 471

Chair Storage, Auxiliary
Universal Bleacher Co., 282

Chair Trucks
Brewer-Titchener Corp., 365

Chairs, Assembly, Lecture Room, etc.
General Fireproofing Co., 402, 403; 502, 503

Chairs, Folding & Portable
Brewer-Titchener Corp., 365
Lyon Metal Products, Inc., 410
Stewart Iron Works Co., 244

Chairs, Metal
Doehler Metal Furniture Co., Inc., 461-464
General Fireproofing Co., 402, 403; 502, 503
Lyon Metal Products, Inc., 410
Simmons Co., 466, 467

Chairs, Office & Library
Art Metal Construction Co., 389-396
General Fireproofing Co., 402, 403; 502, 503
Globe-Wernicke Co., 404, 405
Universal Equipment Co., 465

Chairs, Tablet Arm
General Fireproofing Co., 402, 403; 502, 503

Chalk Troughs
Loxit Co., 156, 157
Milcor Steel Co., 104, 105

Charging Desks
General Fireproofing Co., 402, 403; 502, 503
Globe-Wernicke Co., 404, 405
Remington Rand Inc., 381-388

Chases, Type
American Type Founders, 547

Chemical Apparatus
Barnstead Still & Sterilizer Co., Inc., 510
F. J. Stokes Machine Co., 512

Child Accounting Records
Art Metal Construction Co., 389-396
Remington Rand Inc., 381-388

Chisels
Stanley Tools, Div. Stanley Works, 536

Chlorine Control Apparatus
Mathieson Alkali Works, 284
Wallace & Tiernan Co., Inc., 287

Chlorine, Liquid
Mathieson Alkali Works, 284
Pennsylvania Salt Mfg. Co., 285

Cleaners, Swimming Pool
Spencer Turbine Co., 215

Cleaners, Vacuum
Kent Co., Inc., 210
Spencer Turbine Co., 215
B. F. Sturtevant Co., 109

Cleaning Compounds
Hild Floor Machine Co., 208, 209
Hillyard Sales Co., 196, 197
J. I. Holcomb Mfg. Co., 198, 199
A. C. Horn Co., 191-194
Midland Chemical Laboratories, 200, 201
Thos. Moulding Floor Mfg. Co., 77
Pennsylvania Salt Manufacturing Co., 285
Selig Co., 202, 203
United Laboratories, Inc., 214
West Disinfecting Co., 204, 205

Climbing Apparatus
Mitchell Manufacturing Co., 291; 366
Recreation Equipment Co., 292

Clocks, Electric Program
Cincinnati Time Recorder Co., 135
Holtzer-Cabot Electric Co., 136-138; 524
International Business Machines Corp., 140, 141
Montgomery Time Systems, 142
Warren Telechron Co., 139

Clocks, Tower & Outside
International Business Machines Corp., 140, 141
Warren Telechron Co., 139

Coffee
John Sexton & Co., 488

Coffee Urns
Aluminum Cooking Utensil Co., 478
S. Blickman, Inc., 485
Silex Co., 479
Nathan Straus-Duparquet, Inc., 486

Color Gelatines & Frames
Capitol Stage Lighting Co., 353-360
Kliegl Bros. Universal Electric Stage Lighting Co., Inc., 362

Color Lighting (see Lighting Equipment & Supplies)

Colorimeters
Bausch & Lomb Optical Co., 345; 513
Spencer Lens Co., 346; 514

Combination Locks
National Lock Co., 379
Yale & Towne Mfg. Co., 380

Commercial & Typewriter Tables
All-Steel-Equip Co., Inc., 398
Art Metal Construction Co., 389-396
Doehler Metal Furniture Co., Inc., 461-464
General Fireproofing Co., 402, 403; 502, 503
Globe-Wernicke Co., 404, 405
Remington Rand Inc., 381-388

Composing Sticks
American Type Founders, 547

Concrete Acceleration
Columbia Alkali Corp., 237
Solvay Sales Corp., 286

Concrete Products
American Concrete Corp., 164

Condiments
John Sexton & Co., 488

Conduit
American District Steam Co., 101
Ehret Magnesia Mfg. Co., 102
Ric-wiL Co., 103

Control Equipment, Temperature
Powers Regulator Co., 110, 111
Warren Webster & Co., 112

Controlled Reading
American Optical Co., 347

Cooking Equipment
Aluminum Cooking Utensil Co., 478
S. Blickman, Inc., 485
G. S. Blodgett Co., Inc., 473
Cleveland Range Co., 474
Edison General Electric Appliance Co., 476
Standard Gas Equipment Corp., 477
Nathan Straus-Duparquet, Inc., 486
John Van Range Co., 487

Cork Flooring
Armstrong Cork Co., 69
Congoleum-Nairn Inc., 70, 71

Costumers
Security Steel Equipment Corp. 408, 409

Counterbalance Rigging, Stage
Automatic Devices Co., 352
J. R. Clancy Inc., 361

Counters, Sectional
Art Metal Construction Co., 389-396
General Fireproofing Co., 402, 403; 502, 503
Globe-Wernicke Co., 404, 405
Lyon Metal Products, Inc., 410
Security Steel Equipment Corp., 408, 409

Cove Base
American Concrete Corp., 164
B & T Floor Co., 80, 81
Thos. Moulding Floor Mfg. Co., 77
National Terrazzo & Mosaic Assn., 84, 85

Cove, Metal
B & T Floor Co., 80, 81
Milcor Steel Company, 104, 105

Cream Whippers
Hobart Mfg. Co., 481

Curtain Hoist and Track
Automatic Devices Co., 352
J. R. Clancy Inc., 361
I. Weiss and Sons, Inc., 363

Curtain Machines
Automatic Devices Co., 352
J. R. Clancy Inc., 361

Curtains, Stage
J. R. Clancy Inc., 361
I. Weiss and Sons, Inc., 363

Cutters, Food
Hobart Manufacturing Co., 481
John E. Smith's Sons Co., 482

Cutters, Gear & Milling
Brown & Sharpe Mfg. Co., 538, 539

Cyclorama Settings
I. Weiss and Sons, Inc., 363

Dairy Barn Equipment
Mitchell Mfg. Co., 291; 366

Dampproofing
Barrett Co., 97
A. C. Horn Co., 191-194
United Laboratories, Inc., 214

Delineascopes
Spencer Lens Co., 346; 514

Desk Refinishing
A. C. Horn Co., 191-194

Desks
All-Steel-Equip Co., Inc., 398
Art Metal Construction Co., 389-396
Berger Mfg. Div., Republic Steel Corp., 125; 399
Doehler Metal Furniture Co., 461-464
General Fireproofing Co., 402, 403; 502, 503

Desks (cont.)
Globe-Wernicke Co., 404, 405
Metal Office Furniture Co., 406, 407
Remington Rand Inc., 381-388
Security Steel Equipment Corp., 408, 409
Simmons Co., 466, 467
Universal Equipment Co., 465
Yawman and Erbe Mfg. Co., 397

Developing Machines
Ozalid Corp., 549

Dictating Machines
Dictaphone Sales Corp., 414, 415
Ediphone, 412, 413

Dimmers
Capitol Stage Lighting Co., 353-360
Kliegl Bros. Universal Electric Stage Lighting Co., Inc., 362

Directories
Acme Bulletin & Directory Board Corp., 483
Akins Sales Co., Inc., 167
Tablet & Ticket Co., 367

Directory Boards, Bronze
Akins Sales Co., Inc., 167

Dishwasher Cleanser
Mathieson Alkali Works, 284
Pennsylvania Salt Manufacturing Co., 285

Dishwashing Machines
S. Blickman, Inc., 485
Hobart Mfg. Co., 481
Nathan Straus-Duparquet, Inc., 486

Disinfectants
Hillyard Sales Co., 196, 197
J. I. Holcomb Mfg. Co., 198, 199
Mathieson Alkali Works, 284
Midland Chemical Laboratories, Inc., 200, 201
Pennsylvania Salt Mfg. Co., 285
Selig Co., 202, 203
West Disinfecting Co., 204, 205

Dispensers, Soap (see Soap Dispensers)

Display Cases (see Cases)

Display Rail
Loxit Co., 156, 157

Distilling Apparatus
Barnstead Still and Sterilizer Co., Inc., 510
F. J. Stokes Machine Co., 512

Diving Boards & Fulcrum Equipment
American Playground Device Co., 288, 289
Everwear Manufacturing Co., 290
Mitchell Manufacturing Co., 291; 366
Recreation Equipment Co., 292

Domestic Science Equipment
Art Metal Construction Co., 389-396
Bacon and Vincent Co., 445-452
S. Blickman, Inc., 485
Doehler Metal Furniture Co., 461-464
Excel Metal Cabinet Co., Inc., 444
Ironrite Ironer Co., 442
Laboratory Furniture Co., 505
Mutschler Brothers Co., 604
Singer Sewing Machine Co., 443
Standard Gas Equipment Corp., 477
Nathan Straus-Duparquet, Inc., 486
Universal Equipment Co., 465
John Van Range Co., 487
R. Wallace & Sons Mfg. Co., 480
Whitehead Metal Products, 453-460

Door Closers
Norton Door Closer Co., 159
Norton Lasier Co., 160

Door Locks
National Lock Co., 379
Yale & Towne Mfg. Co., 380

Door Saddles & Sills, Safety
Alberene Stone Corp. of Va., 506
American Mason Safety Tread Co., 82
Safe Tread Co., 83

Doors, Steel Rolling, Fire or Service
Cornell Iron Works, Inc., 148
Kinnear Mfg. Co., 146, 147

Dormitory Cabinets
Miami Cabinet Div., Philip Carey Co., 468, 469

Dormitory Furniture
Doehler Metal Furniture Co., 461-464
Simmons Co., 466, 467
Universal Equipment Co., 465

Dormitory Supplies
R. Wallace & Sons Mfg. Co., 480

Drafting Room Equipment
Ozalid Corp., 549
Wickes Brothers, 550

Drain Cleaning Tools
Allan J. Coleman, 216

Drain Foundation Tile
Ric-wiL Co., 103

Drainage Pipe & Fittings
General Ceramics Co., 507
Maurice A. Knight, 508
Pacific Foundry Co., Ltd., 504

Drains, Roof
Barrett Co., 97

Draperies & Curtains
J. R. Clancy, Inc., 361
I. Weiss and Sons, Inc., 363

Driers, Blueprint
Wickes Brothers, 550

Driers, Hair & Hand
Chicago Hardware Foundry Co., 116

Driers, Laboratory
F. J. Stokes Machine Co., 512

Drill Presses
Delta Mfg. Co., 542
Walker-Turner Co., Inc., 545
Yates-American Machine Co., 540, 541

Drill Stands
Stanley Electric Tool Div., Stanley Works, 535

Drills, Portable Electric
Stanley Electric Tool Div., Stanley Works, 535

Drinking Fountains
American Concrete Corp., 164
Crane Co., 117
Halsey W. Taylor Co., 118

Drying Racks
American Type Founders, 547

Ducts, Acid Fume
Duriron Co., 509
Pacific Foundry Co., Ltd., 504

Duplicators, Gelatin
Ditto, Inc., 418

Duplicators, Liquid
Ditto, Inc., 418

Duplicator Supplies
Ditto, Inc., 418
Miller-Bryant-Pierce Co., 419

Dust Laying
Columbia Alkali Corp., 237
Solvay Sales Corp., 286

Earthenware, Acid-Resisting (see Stoneware)

Educational Talking Pictures (see Teaching Films)

Egg Boilers, Automatic
Edison General Electric Appliance Co., 476

Ejectors, Laboratory Fume
Duriron Co., 509
Pacific Foundry Co., Ltd., 504

Electric Driers
Chicago Hardware Foundry Co., 116

Electric Floor Sanding Machines
Lincoln-Schlueter Floor Machinery Co., Inc., 211

Electric Floor Scrubbing-Polishing Machines
Advance Machine Co., Inc., 206
General Floorcraft, Inc., 207
Hild Floor Machine Co., 208, 209
Hillyard Sales Co., 196, 197
Kent Co., Inc., 210
Lincoln-Schlueter Floor Machinery Co., Inc., 211
Midland Chemical Laboratories, Inc., 200, 201
G. H. Tennant Co., 212

Electric Storage Batteries
Thomas A. Edison, Inc., 521
Electric Storage Battery Co., 143; 522

Electric Tools
R. L. Carter Div., Stanley Works, 537
Stanley Electric Tool Div., Stanley Works, 535

Electrical Measuring Instruments
General Electric Co., 124; 274, 275; 320; 515-518
General Radio Co., 523
Rawson Electrical Instrument Co., 519
RCA Mfg. Co., Inc., 325-340
Weston Electrical Instrument Corp., 126; 520

Elevator Door Sills, Safety
American Mason Safety Tread Co., 82
Safe Tread Co., 83

Enamels
A. C. Horn Co., 191-194

Exit-Alarm Systems
Gamewell Co., 129-134

Exit Signs (see Signs, Exit)

Expansion Joint Material
Barrett Co., 97
Philip Carey Co., Inc., 98
A. C. Horn Co., 191-194
Johns-Manville, 86-88
Servicised Products Corp., 78

Fans
B. F. Sturtevant Co., 109

Fans, Exhaust
Duriron Co., 509
General Ceramics Co., 507
Maurice A. Knight, 508
Pacific Foundry Co., Ltd., 504
B. F. Sturtevant Co., 109

Faucets
Crane Co., 117
Mueller Co., 106
Speakman Co., 114, 115

Felts, Roofing
Barrett Co., 97
Philip Carey Co., Inc., 98
Ruberoid Co., 99
United Laboratories, Inc., 214

Fence Ornamental
American Playground Device Co., 288, 289
Stewart Iron Works Co., 244

Fencing, Iron and Chain Link
Anchor Post Fence Co., 239
Colorado Fuel & Iron Corp., 240
Continental Steel Corp., 241
Cyclone Fence Co., 242
W. F. Robertson Steel & Iron Co., 243
Stewart Iron Works Co., 244
Wickwire Spencer Steel Co., 245

Figures (Gummed Paper) for Charts, etc.
Tablet & Ticket Co., 367

Filing Equipment
All-Steel-Equip Co., Inc., 398
Art Metal Construction Co., 389-396
Berger Mfg. Div., Republic Steel Corp., 125; 399
General Fireproofing Co., 402, 403; 502, 503
Globe-Wernicke Co., 404, 405
Lyon Metal Products, Inc., 410
Metal Office Furniture Co., 406, 407
Remington Rand Inc., 381-388
Security Steel Equipment Corp., 408, 409
Yawman and Erbe Mfg. Co., 397

Filing Systems
Art Metal Construction Co., 389-396
General Fireproofing Co., 402, 403; 502, 503
Remington Rand Inc., 381-388
Yawman and Erbe Mfg. Co., 397

Film Cabinets (see Cabinets, Special)

Films
Bell & Howell Co., 342
Erpi Classroom Films, Inc., 321-323
General Electric Co., 124; 274, 275; 320; 515-518
Spencer Lens Co., 346; 514

Filmslide Projectors
Spencer Lens Co., 346; 514

Filter Paper
Eaton-Dikeman Co., 511

Filters, Suction, Acid Resisting
General Ceramics Co., 507
Maurice A. Knight, 508

Filters, Water (see Water Filters)

Fire Alarm Systems
Cincinnati Time Recorder Co., 135
Connecticut Telephone & Electric Corp., 127
Gamewell Co., 129-134
Holtzer-Cabot Electric Co., 136-138; 524
International Business Machines Corp., 140, 141
Thomas-Smith Co., 603

Fire Doors
Cornell Iron Works, Inc., 148
Kinnear Mfg. Co., 146, 147

Fire Extinguishers, Automatic
Rockwood Sprinkler Co., 144, 145

Fire Protection Equipment
Rockwood Sprinkler Co., 144, 145

Fittings & Valves
Crane Co., 117
Speakman Co., 114, 115

Flagpoles
John E. Lingo & Son, Inc., 168
Stewart Iron Works Co., 244
Traffic & Street Sign Co., 165

Flashing
American Brass Co., 96
Barrett Co., 97
Revere Copper & Brass Inc., 166

Floodlighting
American Playground Device Co., 288, 289
Anchor Post Fence Co., 239
Benjamin Electric Mfg. Co., 272, 273
Capitol Stage Lighting Co., 353-360
Crouse-Hinds, 276
General Electric Co., 124; 274, 275; 320; 515-518
Graybar Electric Co., 128
Kliegl Bros. Universal Electric Stage Lighting Co., Inc., 362
I. Weiss and Sons, Inc., 363
Westinghouse Elec. & Mfg. Co., 123; 277

Floor Brushes (see Brushes)

Floor Covering
Armstrong Cork Co., 69
Congoleum-Nairn Inc., 70, 71

Floor Covering, Mastic
United Laboratories, Inc., 214

Floor Finishes & Dressings
American Crayon Co., 195
General Floorcraft, Inc., 207
Hild Floor Machine Co., 208, 209
Hillyard Sales Co., 196, 197
J. I. Holcomb Mfg. Co., 198, 199
A. C. Horn Co., 191-194
Midland Chemical Laboratories, Inc., 200, 201
Selig Co., 202, 203
United Laboratories, Inc., 214
West Disinfecting Co., 204, 205

Floor Machines (Scrubbing-Polishing)
Advance Machine Co., Inc., 206
General Floorcraft, Inc., 207
Hild Floor Machine Co., 208, 209
Hillyard Sales Co., 196, 197
Kent Co., Inc., 210
Lincoln-Schlueter Floor Machinery Co., Inc., 211
Midland Chemical Laboratories, Inc., 200, 201
G. H. Tennant Co., 212

Floor Maintenance Systems
G. H. Tennant Co., 212

Floor Paints
A. C. Horn Co., 191-194
United Laboratories, Inc., 214

Floor Plates, Safety
American Mason Safety Tread Co., 82
Safe Tread Co., 83

Floor Repairing, Concrete
United Laboratories, Inc., 214

Floor Sanding Equipment (see Sanders, Floor)

Flooring
Alberene Stone Corp. of Va., 506
American Concrete Corp., 164
Armstrong Cork Co., 69
Congoleum-Nairn Inc., 70, 71
Goodyear Tire & Rubber Co., Inc., 76
Jennison-Wright Co., 72, 73
Johns-Manville, 86-88
Loxit Co., 74, 75
Thos. Moulding Floor Mfg. Co., 77
National Terrazzo & Mosaic Assn., 84, 85
Servicised Products Corp., 78
Structural Slate Co., 155
Tile-Tex Co., 65-68
United Laboratories, Inc., 214
Wright Rubber Products Co., 79

Flush Valves
Crane Co., 117
Speakman Co., 114, 115

Flushers, Hydraulic
Allan J. Coleman, 216

Folding Bleachers
Leavitt Corp., 279
Fred Medart Manufacturing Co., 280; 411
Universal Bleacher Co., 282

Folding Chairs (see Chairs, Folding)

Folding Gates (see Gates, Folding)

Folding Tables (see Tables, Folding)

Food Choppers & Cutters
Hobart Mfg. Co., 481
John E. Smith's Sons Co., 482

Food Products
John Sexton & Co., 488

Foot Baths
American Playground Device Co., 288, 289
Hillyard Sales Co., 196, 197
West Disinfecting Co., 204, 205

Footlights
Capitol Stage Lighting Co., 353-360
Kliegl Bros. Universal Electric Stage Lighting Co., Inc., 362

Fountains, Drinking
American Concrete Corp., 164
Crane Co., 117
Halsey W. Taylor Co., 118

Frames, Blackboard & Bulletin Board
Loxit Co., 156, 157
Milcor Steel Company, 104, 105

Fruits, Canned & Dried
John Sexton & Co., 488

Fume Hoods, Laboratory
Alberene Stone Corp. of Va., 506
General Fireproofing Co., 402, 403; 502, 503
Laboratory Furniture Co., 505

Furnaces, Gas
Peck, Stow & Wilcox Co., 546

Furniture, Cafeteria
S. Blickman, Inc., 485
Doehler Metal Furniture Co., Inc., 461-464
Mutschler Brothers Co., 604
Nathan Straus-Duparquet, Inc., 486
Universal Equipment Co., 465
John Van Range Co., 487

Furniture Cups
Faultless Caster Corp., 471

Furniture, Dormitory
Doehler Metal Furniture Co., Inc., 461-464
Simmons Co., 466, 467
Universal Equipment Co., 465

Furniture Glides (Noiseless)
Bassick Co., 364; 470
Buckeye Glide Co., Inc., 472
Faultless Caster Corp., 471

Furniture, Home Economics
Bacon and Vincent Co., 445-452
Excel Metal Cabinet Co., 444
Universal Equipment Co., 465
Whitehead Metal Products, 453-460

Furniture, Kindergarten
Doehler Metal Furniture Co., Inc., 461-464

Furniture, Laboratory & Shop
General Fireproofing Co., 402, 403; 502, 503
Laboratory Furniture Co., 505
Lyons Metal Products, Inc., 410
Yawman and Erbe Mfg. Co., 397

Furniture, Office & Library
Art Metal Construction Co., 389-396
Dictaphone Sales Corp., 414, 415

Furniture, Office & Library (cont.)
Doehler Metal Furniture Co., Inc., 461-464
Ediphone, 412, 413
General Fireproofing Co., 402, 403; 502, 503
Globe-Wernicke Co., 404, 405
Lyon Metal Products, Inc., 410
Metal Office Furniture Co., 406, 407
Mutschler Brothers Co., 604
Remington Rand Inc., 381-388
Security Steel Equipment Corp., 408-409

Furniture, School
Doehler Metal Furniture Co., 461-464
General Fireproofing Co., 402, 403; 502, 503
Mutschler Brothers Co., 604

Furring System, Metal
Milcor Steel Co., 104, 105

Fused Soda Ash
Mathieson Alkali Works, 284

Fuses, Renewable
General Electric Co., 124; 274, 275; 320; 515-518

Gages
Brown & Sharpe Mfg. Co., 538, 539

Galvanometers
General Electric Co., 124; 274, 275; 320; 515-518
Weston Electrical Instrument Corp., 126; 520

Garbage & Waste Incinerators
Kerner Incinerator Co., 113
Selig Co., 202, 203

Gas Ranges and Ovens
Standard Gas Equipment Corp., 477

Gates, Folding
Stewart Iron Works Co., 244
Wickwire Spencer Steel Co., 245

Gates, Iron & Wire
Anchor Post Fence Co., 239
Continental Steel Corp., 241
W. F. Robertson Steel & Iron Co., 243
Stewart Iron Works Co., 244
Wickwire Spencer Steel Co., 245

Generators
General Electric Co., 124; 274, 275; 320; 515-518

Glass Blocks
Pittsburgh Corning Corp., 153

Glass, Optical, Prismatic, Colored, etc.
Bausch & Lomb Optical Co., 345; 513
Spencer Lens Co., 346; 514

Glass, Safety
American Window Glass Co., 563

Glassware, Laboratory, Cooking, etc.
Nathan Straus-Duparquet, Inc., 486
John Van Range Co., 487

Glassware, Lighting
Chase Brass & Copper Co., Inc., 119
Corning Glass Works, 120, 121
Gleason-Tiebout Glass Co., 118
Graybar Electric Co., 128
Westinghouse Electric & Mfg. Co., 123; 277

Glides (Adjustable, Noiseless)
Bassick Co., 364; 470
Buckeye Glide Co., Inc., 472
Faultless Caster Corp., 471

Globes & Glassware, Lighting
Chase Brass & Copper Co., Inc., 119
Corning Glass Works, 120, 121
F. W. Wakefield Brass Co., 122

Glue Pots, Electric
Oliver Machinery Co., 543

Golf Course Equipment
Coldwell Lawn Mower Co., 235
Gravely Manufacturing Co., 230
Jacobsen Mfg. Co., 231
Moto-Mower Co., 232
Toro Manufacturing Co., 236

Gongs, Fire Alarm
Holtzer-Cabot Electric Co., 136-138; 524
International Business Machines Corp., 140, 141
Thomas-Smith Co., 603

Grandstands
Atlas Portable Bleachers, 278
Leavitt Corp., 279
Pittsburgh-Des Moines Steel Co., 281
Universal Bleacher Co., 282
Williams Iron Works, Inc., 283

Grilles, Metal Rolling
Cornell Iron Works, Inc., 148
Kinnear Mfg. Co., 146, 147

Grilles, Sliding
Cornell Iron Works, Inc., 148

Grills & Griddles, Electric
Edison General Electric Appliance Co., Inc., 476

Grinders
Brown & Sharpe Mfg. Co., 538, 539
Delta Mfg. Co., 542
Oliver Machinery Co., 543
Stanley Electric Tool Div., Stanley Works, 535
Walker-Turner Inc., 545
Yates-American Machine Co., 540, 541

Groceries
John Sexton & Co., 488

Gummed Paper Letters & Figures
Tablet & Ticket Co., 367

Gymnasium Bleachers, Folding
Atlas Portable Bleachers, 278
Leavitt Corp., 279
Fred Medart Manufacturing Co., 280; 411
Universal Bleacher Co., 282
Williams Iron Works, Inc., 283

Gymnasium Equipment
American Playground Device Co., 288, 289
Everwear Mfg. Co., 290
Fred Medart Manufacturing Co., 280; 411

Gymnasium Floor Maintenance
American Crayon Co., 195
Hillyard Sales Co., 196, 197
J. I. Holcomb Co., 198, 199
A. C. Horn Co., 191-194
Midland Chemical Laboratories, Inc., 200, 201
Selig Co., 202, 203

Gymnasium Flooring
Congoleum-Nairn Inc., 70, 71
Jennison-Wright Co., 72, 73
Loxit Co., 74, 75
Maple Flooring Mfrs. Assn., 69
United Laboratories, Inc., 214

Gymnasium Lighting (see Lighting Equipment)

Gymnasium Lockers (see Lockers)

Hair Driers, Electric
Chicago Hardware Foundry Co., 116

Hammers
Stanley Tools, Div. Stanley Works, 536

Hand Drills
Stanley Tools, Div. Stanley Works, 536

Hand Lawn Mowers (see Lawn Mowers)

Health Records
Art Metal Construction Co., 389-396

Hearing Aids
Western Electric Co., 350, 351

Heat Control Systems
Powers Regulator Co., 110, 111
Warren Webster & Co., 112

Heating Equipment
American District Steam Co., 101
Nash Engineering Co., 107
John J. Nesbitt, Inc., 108
B. F. Sturtevant Co., 109

Heating Materials
Milcor Steel Company, 104, 105

Heating, Vacuum System
Warren Webster & Co., 112

Hedges
Cole Nursery Co., 229

Herbarium Cases
Globe-Wernicke Co., 404, 405

Hollow Ware Service
R. Wallace & Sons Mfg. Co., 580

Homemaking Furniture & Equipment
Art Metal Construction Co., 389-396
Bacon and Vincent Co., 445-452
S. Blickman, Inc., 485
Excel Metal Cabinet Co., Inc., 444
Ironrite Ironer Co., 442
Singer Sewing Machine Co., 443

Household Appliances
S. Blickman, Inc., 485
Graybar Electric Co., 128
Singer Sewing Machine Co., 443
Nathan Straus-Duparquet, Inc., 486
John Van Range Co., 487

H_2S Generators
General Ceramics Co., 507
Maurice A. Knight, 508

Humidity Control Apparatus
Powers Regulator Co., 110, 111

Hypochlorite
Mathieson Alkali Works, 284
Pennsylvania Salt Mfg. Co., 285

Ice Removal
Columbia Alkali Corp., 237
Solvay Sales Corp., 286

Illumination Control
General Electric Co., 124; 274, 275; 320; 515-518
Weston Electrical Instrument Corp., 126; 520

Imposing Tables
American Type Founders, 547

Incinerators for Garbage & Waste Disposal
Kerner Incinerator Co., 113
Selig Co., 202, 203

Indexes and Card Index Systems
Art Metal Construction Co., 389-396
General Fireproofing Co., 402, 403; 502, 503
Globe-Wernicke Co., 404, 405
Remington Rand Inc., 381-388
Yawman and Erbe Mfg. Co., 397

Infirmary Equipment
Doehler Metal Furniture Co., 461-464
Simmons Co., 466, 467
Universal Equipment Co., 465

Inks, Printing
American Type Founders, 547

Inks, Stencil
Miller-Bryant-Pierce Co., 419

Insecticides
Hillyard Sales Co., 196, 197
J. I. Holcomb Mfg. Co., 198, 199
Midland Chemical Laboratories, Inc., 200, 201
Selig Co., 202, 203
West Disinfecting Co., 204, 205

Instruments for Reading Instruction
American Optical Co., 347

Instruments, Portable, Electrical
General Electric Co., 124; 274, 275; 320; 515-518
General Radio Co., 523
Rawson Electrical Instrument Co., 519
Weston Electrical Instrument Corp., 126; 520

Instruments, Switchboard
Weston Electrical Instrument Corp., 126; 520

Insulation
American District Steam Co., 101
Philip Carey Co., Inc., 98
Celotex Corp., 89-91
Johns-Manville, 86-88
Loxit Co., 92-94
Ruberoid Co., 99
Wood Conversion Co., 95

Insulation, Conduit
American District Steam Co., 101
Ehret Magnesia Co., 102
Ric-wiL Co., 103

Integral Waterproofing
A. C. Horn Co., 191-194

Inter-Phones
Connecticut Telephone & Electric Corp., 127
Graybar Electric Co., 128
Holtzer-Cabot Electric Co., 136-138; 524
International Business Machines Corp., 140, 141

Iron, Acid Resisting
Pacific Foundry Co., Ltd., 504

Ironing Machines
Ironrite Ironer Co., 442

Janitors' Supplies
General Floorcraft, Inc., 207
Hild Floor Machine Co., 208, 209
Hillyard Sales Co., 196, 197
J. I. Holcomb Mfg. Co., 198, 199
A. C. Horn Co., 191-194
Midland Chemical Laboratories, Inc., 200, 201
Selig Co., 202, 203
West Disinfecting Co., 204, 205

Jars & Containers, Stoneware
General Ceramics Co., 507
Maurice A. Knight, 508

Jig Saws
Oliver Machinery Co., 543
Walker-Turner Co., Inc., 545
Yates-American Machine Co., 540, 541

Jointers, Bench Hand
Delta Mfg. Co., 542
Oliver Machinery Co., 543
Walker-Turner Co., 545
Yates-American Machine Co., 540, 541

Joints, Expansion
American District Steam Co., 101
Philip Carey Co., Inc., 98

Kettles, Fry
Edison General Electric Appliance Co., 476

Kettles, Laboratory
F. J. Stokes Machine Co., 512

Kettles, Steam Jacketed
Aluminum Cooking Utensil Co., 478

Key Cabinets
Durabilt Steel Locker Co., 400, 401
P. O. Moore, Inc., 162, 163

Key Control Systems
P. O. Moore, Inc., 162, 163

Kitchen Equipment
Aluminum Cooking Utensil Co., 478
Bacon and Vincent Co., 445-452
S. Blickman, Inc., 485
G. S. Blodgett Co., Inc., 473
Cleveland Range Co., 474
Crucible Steel Co. of America, 475
Edison General Electric Appliance Co., 476
Excel Metal Cabinet Co., Inc., 444
Hobart Mfg. Co., 481
Mutschler Brothers Co., 604
John E. Smith's Sons Co., 482
Standard Gas Equipment Corp., 477
Nathan Straus-Duparquet, Inc., 486
John Van Range Co., 487
Whitehead Metal Products, 453-460

Labels, Gummed
Tablet & Ticket Co., 367

Laboratory Brass Goods (see Plumbing Brass Goods, Laboratory)

Laboratory Equipment
Alberene Stone Corp. of Va., 506
Barnstead Still and Sterilizer Co., Inc., 510
Bausch & Lomb Optical Co., 345; 513
Duriron Co., 509
General Ceramics Co., 507
General Electric Co., 124; 274, 275; 320; 515-518
General Fireproofing Co., 402, 403; 502, 503
General Radio Co., 523
Holtzer-Cabot Electric Co., 136-138; 524
Maurice A. Knight, 508
Laboratory Furniture Co., 505
Metal Office Furniture Co., 406, 407
Pacific Foundry Co., Ltd., 504
Spencer Lens Co., 346; 514
F. J. Stokes Machine Co., 512

Laboratory Furniture
General Fireproofing Co., 402, 403; 502, 503
Laboratory Furniture Co., 505
Yawman and Erbe Mfg. Co., 397

Laboratory Instruments & Apparatus
Barnstead Still and Sterilizer Co., Inc., 510
Bausch & Lomb Optical Co., 345; 513
Eaton-Dikeman Co., 511
General Electric Co., 124; 274, 275; 320; 515-518
General Radio Co., 523
Rawson Electrical Instrument Co., 519
Spencer Lens Co., 346; 514
F. J. Stokes Machine Co., 512
Weston Electrical Instrument Corp., 126; 520

Laboratory Panels (see Panels, Laboratory)

Laboratory Pipe, Acid Resisting
Duriron Co., 509
General Ceramics Co., 507
Maurice A. Knight, 508
Pacific Foundry Co., Ltd., 504

Laboratory Storage Batteries
Thomas A. Edison, Inc., 521
Electric Storage Battery Co., 143; 522

Lamps
Graybar Electric Co., 128
Kliegl Bros. Universal Electric Stage Lighting Co., Inc., 362
Westinghouse Electric & Mfg. Co., 123; 277

Lanterns
Bausch & Lomb Optical Co., 345; 513
Spencer Lens Co., 346; 514

Lath, Metal
Milcor Steel Company, 104, 105

Lathes, Metal Working
Delta Mfg. Co., 542
Oliver Machinery Co., 543
South Bend Lathe Works, 544

Lathes, Woodworking
Delta Mfg. Co., 542
Oliver Machinery Co., 543
Walker-Turner Co., 545
Yates-American Machine Co., 540, 541

Lavatories & Lavatory Fixtures
Crane Co., 117
Speakman Co., 114, 115

Lawn Mowers & Trimmers
Coldwell Lawn Mower Co., 235
Gravely Manufacturing Co., 230
Jacobsen Mfg. Co., 231
Moto-Mower Company, 232
Standard Mfg. & Sales Corp., 233
Toro Manufacturing Co., 236
Whirlwind Lawn Mowers Sales Corp., 234

Lawn Sweepers
Moto-Mower Co., 232

Lenses (Photographic)
Bausch & Lomb Optical Co., 345; 513
Spencer Lens Co., 346; 514

Letters, Changeable
Acme Bulletin & Directory Board Corp., 483
Akins Sales Co., Inc., 167
Tablet & Ticket Co., 367

Library Equipment
All-Steel-Equip Co., Inc., 398
Art Metal Construction Co., 389-396
Berger Mfg. Div., Republic Steel Corp., 125, 399
Doehler Metal Furniture Co., Inc., 461-464
General Fireproofing Co., 402, 403; 502, 503
Globe-Wernicke Co., 404-405
Lyon Metal Products, Inc., 410
Metal Office Furniture Co., 406, 407
Mutschler Brothers Co., 604
Remington Rand Inc., 381-388
Security Steel Equipment Corp., 408, 409
Universal Equipment Co., 465
Yawman and Erbe Mfg. Co., 397

Library Furniture (see Furniture)

Library Supplies
Globe-Wernicke Co., 404, 405

Light Measuring Instruments
Weston Electrical Instrument Corp., 126; 520

Light-Proof Shades & Materials
Athey Co., 150, 151
Columbus Coated Fabrics Corp., 152

Lighting Control, Photoelectric
General Electric Co., 124; 274, 275; 320; 515-518
Weston Electrical Instrument Corp., 126; 520

Lighting Equipment and Supplies
Benjamin Electric Mfg. Co., 272, 273
Berger Mfg. Div., Republic Steel Corp., 125; 399
Chase Brass and Copper Co., Inc., 119
Corning Glass Works, 120, 121
Crouse-Hinds, 276
General Electric Co., 124; 274, 275; 320; 515-518
Graybar Electric Co., 128
Kliegl Bros. Universal Electric Stage Lighting Co., Inc., 362
F. W. Wakefield Brass Co., 122
Westinghouse Electric & Mfg. Co., 123; 277

Lighting Fixtures
Chase Brass and Copper Co., Inc., 119
Graybar Electric Co., 128
F. W. Wakefield Brass Co., 122
Westinghouse Electric & Mfg. Co., 123; 277

Lighting Glassware
Chase Brass and Copper Co., Inc., 119
Corning Glass Works, 120, 121
F. W. Wakefield Brass Co., 122

Lighting, Gymnasium
Benjamin Electric Mfg. Co., 272, 273

Lighting Reflectors (see Reflectors, Lighting)

Lighting, Stage
Capitol Stage Lighting Co., 353-360
Graybar Electric Co., 128
Kliegl Bros. Universal Electric Stage Lighting Co., Inc., 362
I. Weiss and Sons, Inc., 363

Lighting Standards (Campus)
American Concrete Corp., 164
Graybar Electric Co., 128

Lighting Systems, Emergency
Electric Storage Battery Co., 143; 522

Linoleum
Armstrong Cork Co., 69
Congoleum-Nairn Inc., 70, 71

Liquid Soap Dispensing Systems
Hillyard Sales Co., 196, 197
West Disinfecting Co., 204, 205

Liquid Soaps
Hillyard Sales Co., 196, 197
J. I. Holcomb Mfg. Co., 198, 199
Midland Chemical Laboratories, Inc., 200, 201
Selig Co., 200, 201
West Disinfecting Co., 204, 205

Lockers, Steel
All-Steel-Equip Co., Inc., 398
Art Metal Construction Co., 389-396
Berger Mfg. Div., Republic Steel Corp., 125; 399
Durabilt Steel Locker Co., 400, 401
General Fireproofing Co., 402, 403; 502, 503
Lyon Metal Products, Inc., 410
Fred Medart Manufacturing Co., 280; 411
Metal Office Furniture Company, 406, 407
Remington Rand Inc., 381-388

Locks, Combination
National Lock Co., 379
Yale & Towne Mfg. Co., 380

Locks, Key
National Lock Co., 379
Yale & Towne Mfg. Co., 380

Loose Leaf Books & Systems
Remington Rand Inc., 381-388

Machines, Milling, Grinding, etc.
Brown & Sharpe Mfg. Co., 538, 539

Magnesia Insulation
Ehret Magnesia Mfg. Co., 102

Magnifiers
Bausch & Lomb Optical Co., 345; 513
Spencer Lens Co., 346; 514

Manual Training Equipment
Brown & Sharpe Mfg. Co., 538, 539
R. L. Carter Div., Stanley Works, 537
Delta Mfg. Co., 542
New Britain Machine Co., 548
Oliver Machinery Co., 543
Peck, Stow & Wilcox Co., 546
South Bend Lathe Works, 544
Stanley Electric Tool Div., Stanley Works, 535
Stanley Tools, Div. Stanley Works, 536
Walker-Turner Co., Inc., 545
Yates-American Machine Co., 540, 541

Marble Products
American Concrete Corp., 164

Mats, Filter
Eaton-Dikeman Co., 511

Mats, Gymnasium
American Playground Device Co., 288, 289
Everwear Mfg. Co., 290

Matting, Rubber
American Playground Device Co., 288, 289
J. I. Holcomb Mfg. Co., 198, 199
Servicised Products Corp., 78

Mattresses
Doehler Metal Furniture Co., Inc., 461-464
Simmons Co., 466, 467

Meat Choppers
John E. Smith's Sons Co., 482

Medals, Bronze
General Bronze Corp., 149

Memorial Plates
Akins Sales Co., Inc., 167
General Bronze Corp., 149
James H. Matthews & Co., 161

Menu Boards
Acme Bulletin & Directory Board Corp., 483
Akins Sales Co., Inc., 167
Tablet & Ticket Co., 367

Metal Spinning Lathes
Oliver Machinery Co., 543

Metal Trim
B & T Floor Co., 80, 81
Milcor Steel Company, 104, 105

Metal Weather Strips
Athey Co., 150, 151

Meters, Electric
General Electric Co., 124; 274, 275; 320; 515-518
General Radio Co., 523
Rawson Electrical Instrument Co., 519
Weston Electrical Instrument Corp., 126; 520

Meters, Steam Condensation
American District Steam Co., 101

Micrometers
Brown & Sharpe Mfg. Co., 538, 539

Microphones
Western Electric Co., 350, 351

Micro-Projectors
Bausch & Lomb Optical Co., 345; 513

Microscopes & Accessories
Bausch & Lomb Optical Co., 345; 513
Spencer Lens Co., 346; 514

Milling Machines
Brown & Sharpe Mfg. Co., 538, 539

Mills, Coffee & Spice
Hobart Mfg. Co., 481

Mills, Jar
F. J. Stokes Machine Co., 512

Mitre Boxes
Stanley Tools, Div. Stanley Works, 536

Mixers, Food
Hobart Mfg. Co., 481

Mixers, Laboratory
F. J. Stokes Machine Co., 512

Mixing Valves (see Valves, Mixing)

Monuments, Bronze
General Bronze Corp., 149

Mops
Hillyard Sales Co., 196, 197
J. I. Holcomb Mfg. Co., 198, 199

Mortisers
Oliver Machinery Co., 543
Yates-American Machine Co., 540, 541

Motion Picture Cameras (see Cameras, Motion Picture)

Motion Picture Films (see Films)

Motion Picture Projectors (see Projectors, 16 mm. and Projectors, 35 mm.)

Motion Picture Screens
Da-Lite Screen Co., Inc., 348, 349
I. Weiss and Sons Inc., 363

Motion Pictures
Erpi Classroom Films Inc., 321-323
General Electric Co., 124; 274, 275; 320; 515-518

Motor Generator Sets
General Electric Co., 124; 274, 275; 320; 515-518

Motors
General Electric Co., 124; 274, 275; 320; 515-518
Graybar Electric Co., 128

Moulding
Wood Conversion Co., 95

Mouldings, Metal
Loxit Co., 156, 157

Museum Cases (see Cases, Museum & Display)

Music Reproduction Systems
RCA Mfg. Co., Inc., 325-340
Western Electric Co., 350, 351

Music Stands
Kliegl Bros. Universal Electric Stage Lighting Co., Inc., 362

Name Plates, Desk
Akins Sales Co., Inc., 167
Tablet & Ticket Co., 367

Nosing & Edging, Metal
B & T Floor Co., 80, 81

Nursery Stock
Cole Nursery Co., 229

Office Equipment
Art Metal Construction Co., 389-396
Metal Office Furniture Co., 406, 407
Remington Rand Inc., 381-388
Security Steel Equipment Corp., 408, 409
Yawman and Erbe Mfg. Co., 397

Office Machines
Dictaphone Sales Corp., 414, 415
Ediphone, 412, 413
Remington Rand Inc., 381-388
Underwood Elliott Fisher Co., 416, 417

Optical Measuring Instruments
Bausch & Lomb Optical Co., 345; 513
Spencer Lens Co., 346; 514

Oscillators
General Radio Co., 523

Oscillographs
General Electric Co., 124; 274, 275; 320; 515-518
RCA Mfg. Co., Inc., 325-340

Ovens, Electric
Edison General Electric Appliance Co., 476

Ovens, Gas
G. S. Blodgett Co., Inc., 473
Standard Gas Equipment Corp., 477

Packing
Ehret Magnesia Mfg. Co., 102

Padlocks
National Lock Co., 379
Yale & Towne Mfg. Co., 380

Paint, Casein
Muralo Co., Inc., 213

Paint, Cement
Muralo Co., Inc., 213

Paints & Varnishes
Hillyard Sales Co., 196, 197
A. C. Horn Co., 191-194
United Laboratories, Inc., 214

Paneling
Celotex Corp., 89-91
Wood Conversion Co., 95

Panels, Control
General Electric Co., 124; 274, 275; 320; 515-518

Panels, Key
P. O. Moore, Inc., 162, 163

Panels, Laboratory
Cincinnati Time Recorder Co., 135
Connecticut Telephone & Electric Corp., 127
General Electric Co., 124; 274, 275; 320; 515-518
Holtzer-Cabot Electric Co., 136-138; 524
International Business Machines Corp., 140, 141

Paper Cutters
American Type Founders, 547

Paper, Laboratory Lining
Eaton-Dikeman Co., 511

Paper Towels
West Disinfecting Co., 204, 205

Papers, Filter
Eaton-Dikeman Co., 511

Partitions
Alberene Stone Corp. of Va., 506
American Concrete Corp., 164
Art Metal Construction Co., 389-396
Bolger-Heller Slate Co., 158
Celotex Corp., 89-91
National Terrazzo & Mosaic Assn., 84, 85
Structural Slate Co., 155

Partitions, Rolling
Kinnear Mfg. Co., 146, 147

Partitions, Wire
Stewart Iron Works Co., 244

Peelers, Vegetable
Hobart Mfg. Co., 481

Phonograph Equipment
RCA Mfg. Co., Inc., 325-340

Photoelectric Units
General Electric Co., 124; 274, 275; 320; 515-518
Weston Electrical Instrument Corp., 126; 520

Photographic Lenses
Bausch & Lomb Optical Co., 345; 513
Spencer Lens Co., 346; 514

Photomicrographic Equipment
Bausch & Lomb Optical Co., 345; 513
Spencer Lens Co., 346; 514

Photoreproduction Equipment
Ozalid Corp., 549

Physics, Apparatus for
General Electric Co., 124; 274, 275; 320; 515-518
General Radio Co., 523
Rawson Electrical Instrument Co., 519
Weston Electrical Instrument Corp., 126; 520

Piano Casters
Bassick Co., 364; 470

Pipe Cleaners
Allan J. Coleman, 216

Pipe Covering
Ehret Magnesia Mfg. Co., 102
Ric-wiL Co., 103
Ruberoid Co., 99

Pipe, Insulated
Ehret Magnesia Mfg. Co., 102

Pipe, Waste & Drainage (see Drainage Pipe)

Pipe & Fittings
Crane Co., 117
Revere Copper & Brass Inc., 166

Pipe & Fittings, Acid Resisting
Duriron Co., 509
General Ceramics Co., 507
Maurice A. Knight, 508
Pacific Foundry Co., Ltd., 504

Planers
Oliver Machinery Co., 543
Stanley Tools, Div. Stanley Works, 536
Walker-Turner Co., Inc., 545
Yates-American Machine Co., 540, 541

Planfiles
Art Metal Construction Co., 389-396

Plaques, Wall
Acme Bulletin & Directory Board Corp., 483
Akins Sales Co., Inc., 167
General Bronze Corp., 149
James H. Matthews & Co., 161
Stewart Iron Works Co., 244

Plastic Ware, Lighting
Chase Brass & Copper Co., Inc., 119
F. W. Wakefield Brass Co., 122

Plated Ware
R. Wallace & Sons Mfg. Co., 480

Playground Apparatus
American Playground Device Co., 288, 289
Anchor Post Fence Co., 239
Everwear Mfg. Co., 290
Fred Medart Manufacturing Co., 280; 411
Mitchell Mfg. Co., 291; 366
Recreation Equipment Co., 292

Playground Surfacing
Socony-Vacuum Oil Co., Inc., 238
Texas Co., 100
United Laboratories, Inc., 214

Plumbing & Plumbing Brass Goods
Crane Co., 117
Mueller Co., 106
Speakman Co., 114, 115

Plumbing Brass Goods, Laboratory
Mueller Co., 106

Portable Bleachers
Atlas Portable Bleachers, 278
Universal Bleacher Co., 282
Williams Iron Works, Inc., 283

Portable Chairs (see Chairs, Folding & Portable)

Portable Screens
Da-Lite Screen Co., Inc., 348, 349

Portable Sound Systems
RCA Mfg. Co., Inc., 325-340

Portable Stands, Band & Choral
Mitchell Mfg. Co., 291; 366

Portable Typewriters
Remington Rand Inc., 381-388
Underwood Elliott Fisher Co., 416, 417

Portable Vacuum Cleaners, Heavy Duty (see Vacuum Cleaners, Portable, etc.)

Potentiometers
General Electric Co., 124; 274, 275; 320; 515-518

Power Lawn Mowers
Coldwell Lawn Mower Co., 235
Gravely Manufacturing Co., 230
Jacobsen Mfg. Co., 231
Moto-Mower Co., 232
Standard Mfg. & Sales Corp., 233
Toro Manufacturing Co., 236
Whirlwind Lawn Mowers Sales Corp., 234

Practice Equipment for Teaching Filing, etc.
Remington Rand Inc., 381-388
Yawman and Erbe Mfg. Co., 397

Preserves
John Sexton & Co., 488

Presses, Drill
Delta Mfg. Co., 542
Walker-Turner Co., Inc., 545
Yates-American Machine Co., 540, 541

Presses, Printing
American Type Founders, 547

Primer Typewriters
Remington Rand Inc., 381-388

Printing Supplies & Equipment
American Type Founders, 547

Program Clocks (see Clocks, Electric Program)

Projector Stands
Da-Lite Screen Co., Inc., 348, 349

Projectors, 16 mm.
Ampro Corp., 341
Bell & Howell Co., 342
DeVry Corp., 344
RCA Mfg. Co., Inc., 325-340
Victor Animatograph Corp., 343

Projectors, 35 mm.
DeVry Corp., 344
RCA Mfg. Co., Inc., 325-340

Projectors, Still
Bausch & Lomb Optical Co., 345; 513
Capitol Stage Lighting Co., 353-360

Projectors, Still (cont.)
DeVry Corp., 344
RCA Mfg. Co., Inc., 325-340
Spencer Lens Co., 346; 514
Victor Animatograph Corp., 343

Proprietary Fire Alarm Systems
Gamewell Co., 129-134

Public Address Systems
Graybar Electric Co., 128
Holtzer-Cabot Electric Co., 136-138; 524
International Business Machines Corp., 140, 141
RCA Mfg. Co., Inc., 325-340
Western Electric Co. (Distributed by Graybar Elec. Co.), 350, 351

Public Address Systems, Portable
RCA Mfg. Co., Inc., 325-340

Pumps, Centrifugal
Nash Engineering Co., 107

Pumps, Hand
Allan J. Coleman, 216

Pumps, Vacuum & Pressure
Nash Engineering Co., 107
F. J. Stokes Machine Co., 512

Push Button Boards
Cincinnati Time Recorder Co., 135
Connecticut Telephone & Electric Corp., 127

Racks, Gymnasium Basket, Steel
All-Steel-Equip Co., Inc., 398
Durabilt Steel Locker Co., 400, 401
Lyon Metal Products, Inc., 410

Racks, Motion Picture Film
Neumade Products Corp., 324

Racks, Steel (for Checkrooms)
General Fireproofing Co., 402, 403; 502, 503
Lyon Metal Products, Inc., 410

Radiator Valves, Thermostatic
Powers Regulator Co., 110, 111

Radio Equipment—Ultra High Frequency
RCA Mfg. Co., Inc., 325-340

Radio Laboratory Equipment
General Radio Co., 523
RCA Mfg. Co., Inc., 325-340

Radios
Graybar Electric Co., 128
RCA Mfg. Co., Inc., 325-340

Railings, Wrought Iron
Stewart Iron Works Co., 244

Ranges, Electric
Edison General Electric Appliance Co., 476

Ranges, Gas
Standard Gas Equipment Corp., 477

Reading Aids
American Optical Co., 347

Record Systems
Art Metal Construction Co., 389-396
General Fireproofing Co., 402, 403; 502, 503
Globe-Wernicke Co., 404, 405
Remington Rand Inc., 381-388
Yawman and Erbe Mfg. Co., 397

Recording Equipment, Voice
RCA Mfg. Co., Inc., 325-340

Records, Looseleaf
Remington Rand Inc., 381-388

Records, Phonograph
RCA Mfg. Co., Inc., 325-340

Reels, Motion Picture Film
Neumade Products Corp., 324

Refinishing Machines, Desk & Blackboard
A. C. Horn Co., 191-194

Reflectors, Lighting
Benjamin Electric Mfg. Co., 272, 273
Berger Mfg. Div., Republic Steel Corp., 125; 399
Crouse-Hinds, 276
General Electric Co., 124; 274, 275; 320; 515-518

Refrigeration Brines
Columbia Alkali Corp., 237
Solvay Sales Corp., 286

Regulators, Temperature
Powers Regulator Co., 110, 111
Warren Webster & Co., 112

Relays, Photoelectric
General Electric Co., 124; 274, 275; 320; 515-518
Weston Electrical Instrument Corp., 126; 520

Rewinds, Film
Neumade Products Corp., 324

Ribbons, Typewriter (see Typewriter Supplies)

Road Surfacing Materials (see Surfacing Materials, Road)

Rollers, Grass
Moto-Mower Co., 232
Toro Manufacturing Co., 236

Rollers, Window Shade
E. I. du Pont de Nemours & Co., Inc., 622, 623

Roof Coatings
Barrett Co., 97
A. C. Horn Co., 191-194
Ruberoid Co., 99
Texas Co., 100
United Laboratories, Inc., 214

Roof Deck, Steel
Milcor Steel Company, 104, 105

Roofing
Barrett Co., 97
Bolger-Heller Slate Co., 158
Philip Carey Co., Inc., 98
Celotex Corp., 89-91
Johns-Manville, 86-88
Ruberoid Co., 99
Servicised Products Corp., 78
Texas Co., 100
United Laboratories, Inc., 214

Router-Shapers
R. L. Carter Div., Stanley Works, 537

Rubber Flooring
Goodyear Tire and Rubber Co., Inc., 76
Servicised Products Corp., 78
Wright Rubber Products Co., 79

Rubbish Disposal (see Incinerators)

Runners, Rubber Corridor
American Playground Device Co., 288, 289

Safes
Art Metal Construction Co., 389-396
Berger Mfg. Div., Republic Steel Corp., 125; 399
General Fireproofing Co., 402, 403; 502, 503
Metal Office Furniture Co., 406, 407
Remington Rand Inc., 381-388
Yawman and Erbe Mfg. Co., 397

Safety Glass for Buses
American Window Glass Co., 563

Safety Stair Treads
Alberene Stone Corp. of Va., 506
American Concrete Corp., 164
American Mason Safety Tread Co., 82
Bolger-Heller Slate Co., 158
A. C. Horn Co., 191-194
National Terrazzo Mosaic Assn., 84, 85
Safe Tread Co., 83
Servicised Products Corp., 78
Structural Slate Co., 155

Sanders, Belt
Delta Mfg. Co., 542
Oliver Machinery Co., 543
Yates-American Machine Co., 540, 541

Sanders, Drum & Disc
Delta Mfg. Co., 542
Oliver Machinery Co., 543
Yates-American Machine Co., 540, 541

Sanders, Floor
Hild Floor Machine Co., 208, 209
Hillyard Sales Co., 196, 197
Lincoln-Schlueter Floor Machinery Co., Inc., 211

Sanders, Portable Disc
Lincoln-Schlueter Floor Machinery Co., Inc., 211

Sanders, Portable Electric
Oliver Machinery Co., 543

Saws, Band, Circular, Scroll, etc.
Delta Mfg. Co., 542
Walker-Turner Co., Inc., 545
Yates-American Machine Co., 540, 541

Saws, Electric Hand
Oliver Machinery Co., 543

Scenery, Stage
I. Weiss and Sons, Inc., 363

School Buses
International Harvester Co., 566
Superior Coach Corp., 564, 565

School Records & Forms (see Filing Systems)

Score Boards, Electric
Cincinnati Time Recorder Co., 135
General Electric Co., 124; 274, 275; 320; 515-518
Fred Medart Mfg. Co., 280; 411

Scrapbaskets
Globe Wernicke Co., 404, 405
National Vulcanized Fibre Co., 420

Screens, Motion Picture
Da-Lite Screen Co., Inc., 348, 349
I. Weiss and Sons, Inc., 363

Screw Machines
Brown & Sharpe Mfg. Co., 538, 539

Scrubbing Machines, Electric
Advance Machine Co., Inc., 206
General Floorcraft, Inc., 207
Hild Floor Machine Co., 208, 209
Hillyard Sales Co., 196, 197
Kent Co., Inc., 210
Lincoln-Schlueter Floor Machinery Co., Inc., 211
Midland Chemical Laboratories, Inc., 200, 201
G. H. Tennant Co., 212

Seals, Embossed
Tablet & Ticket Co., 367

Seating, Grandstand
Atlas Portable Bleachers, 278
Leavitt Corp., 279
Pittsburgh-Des Moines Steel Co., 281
Universal Bleacher Co., 282
Williams Iron Works, Inc., 283

Secretaries
General Fireproofing Co., 402, 403; 502, 503

Sectional Card Cases
General Fireproofing Co., 402, 403; 502, 503
Globe-Wernicke Co., 404, 405

Settees, Art Marble
American Concrete Corp., 164

Settees, Iron & Wire
Stewart Iron Works Co., 244

Sewage Ejectors
Nash Engineering Co., 107

Sewer Cleaners
Allan J. Coleman, 216

Sewing Machines
Singer Sewing Machine Co., 443

Sewing Room Equipment
Bacon and Vincent Co., 445-452
Ironrite Ironer Co., 442
Singer Sewing Machine Co., 443

Shades, Window
Athey Co., 150, 151
Columbus Coated Fabrics Corp., 152
E. I. du Pont de Nemours & Co., Inc., 622, 623

Shapers
R. L. Carter Div., Stanley Works, 537
Delta Mfg. Co., 542
Oliver Machinery Co., 543
Stanley Electric Tools Div., Stanley Works, 535
Walker-Turner Co., Inc., 545
Yates-American Machine Co., 540, 541

Shears, Portable Electric
Stanley Electric Tool Div., Stanley Works, 535

Sheet Metal Working Equipment
Peck, Stow & Wilcox Co., 546

Shelving, Library (Wood)
Globe-Wernicke Co., 404, 405

Shelving, Steel
All-Steel-Equip Co., Inc., 398
Art Metal Construction Co., 389-396
Berger Mfg. Div., Republic Steel Corp., 125; 399
Excel Metal Cabinet Co., Inc., 444
General Fireproofing Co., 402, 403; 502, 503
Globe-Wernicke Co., 404, 405
Lyon Metal Products, Inc., 410
Fred Medart Manufacturing Co., 280; 411
Metal Office Furniture Co., 406, 407
Remington Rand Inc., 381-388
Security Steel Equipment Corp., 408, 409
Yawman and Erbe Mfg. Co., 397

Shelving, Stoneware
Alberene Stone Corp. of Va., 506

Shingles, Asbestos, Asphalt, etc.
Philip Carey Co., Inc., 98
Johns-Manville, 86-88
Ruberoid Co., 99

Shipping Cases, Film
Neumade Products Corp., 324

Shop Equipment
All-Steel-Equip Co., Inc., 398
American Type Founders, 547
Brown & Sharpe Mfg. Co., 538, 539
R. L. Carter Div., Stanley Works, 537
Delta Mfg. Co., 542
Lyon Metal Products, Inc., 410
Oliver Machinery Co., 543
Ozalid Corp., 549
Peck, Stow & Wilcox Co., 546
South Bend Lathe Works, 544
Stanley Electric Tool Div., Stanley Works, 535
Stanley Tools, Div. Stanley Works, 536
Walker-Turner Co., Inc., 545
Wickes Bros., 550
Yates-American Machine Co., 540, 541

Shower Compartments, Stone
Alberene Stone Corp. of Va., 506

Shower Fittings
Crane Co., 117
Mueller Co., 106
Speakman Co., 114, 115

Shower Mixers, Safety
Powers Regulator Co., 110, 111

Showerway
Lyon Metal Products, Inc., 410

Shrubs
Stumpp & Walker Co., 218

Shutters, Fire
Kinnear Mfg. Co., 146, 147

Sickle Mowers
Gravely Manufacturing Co., 230
Moto-Mower Co., 232
Toro Mfg. Co., 236

Signal Systems
Connecticut Telephone & Electric Corp., 127
Gamewell Co., 129-134
Holtzer-Cabot Electric Co., 136-138; 524
International Business Machines Corp., 140, 141

Signs, Exit
Capitol Stage Lighting Co., 353-360
Kliegl Bros. Universal Electric Stage Lighting Co., Inc., 362
Tablet & Ticket Co., 367

Signs, Restaurant & Cafeteria
Acme Bulletin & Directory Board Corp., 483
Akins Sales Co., Inc., 167
Tablet & Ticket Co., 367

Silverware
R. Wallace & Sons Mfg. Co., 480

Sink Frames
B & T Floor Co., 80, 81

Sinks, Kitchen
Bacon and Vincent Co., 445-452
Excel Metal Cabinet Co., Inc., 444
Whitehead Metal Products, 453-460

Sinks, Laboratory
Alberene Stone Corp. of Va., 506
Duriron Co., 509
General Ceramics Co., 507
Maurice A. Knight, 508
Laboratory Furniture Co., 505

Sinks, Wash
Crane Co., 117

Skylights
Milcor Steel Company, 104, 105
Revere Copper & Brass Inc., 166

Slate Blackboard
Bolger-Heller Slate Co., 158
Natural Slate Blackboard Co., 154

Slate Roofing
Bolger-Heller Slate Co., 158

Slicing Machines
Hobart Mfg. Co., 481
John E. Smith's Sons Co., 482

Slides, Playground
American Playground Device Co., 288, 289
Anchor Post Fence Co., 239
Everwear Mfg. Co., 290
Fred Medart Manufacturing Co., 280; 411
Mitchell Mfg. Co., 291; 366
Recreation Equipment Co., 292

Slides, Stereopticon
Victor Animatograph Corp., 343

Snow Plows
Gravely Manufacturing Co., 230
Moto-Mower Co., 232
Toro Manufacturing Corp., 236

Soap Dispensers
Hillyard Sales Co., 196, 197
West Disinfecting Co., 204, 205

Soap, Liquid
Hillyard Sales Co., 196, 197
J. I. Holcomb Mfg. Co., 198, 199
Midland Chemical Laboratories, Inc., 200, 201
Selig Co., 200, 201
West Disinfecting Co., 204, 205

Soaps
Hild Floor Machine Co., 208, 209
Hillyard Sales Co., 196, 197
J. I. Holcomb Mfg. Co., 198, 199
A. C. Horn Co., 191-194
Midland Chemical Laboratories, Inc., 200, 201
Selig Co., 200, 201

Soapstone
Alberene Stone Corp. of Va., 506

Sound Deadening Materials
Celotex Corp., 89-91
Johns-Manville, 86-88
Loxit Co., 92-94

Sound Motion Picture Equipment—16 mm.
Ampro Corp., 341
Bell & Howell Co., 342
DeVry Corp., 344
Erpi Classroom Films, Inc., 321-323
RCA Mfg. Co., Inc., 325-340
Victor Animatograph Corp., 343

Sound Motion Picture Equipment—35 mm.
DeVry Corp., 344
Erpi Classroom Films, Inc., 321-323
RCA Mfg. Co., Inc., 325-340

Speakers
DeVry Corp., 344
Graybar Electric Co., 128

Spectroscopes
Bausch & Lomb Optical Co., 345; 513

Speech Recording Equipment
RCA Mfg. Co., Inc., 325-340

Spices
John Sexton & Co., 488

Splicers, Film
Neumade Products Corp., 324

Sports Timing Equipment
Cincinnati Time Recorder Co., 135
International Business Machines Corp., 140, 141
Warren Telechron Co., 139

Spotlights
Capitol Stage Lighting Co., 353-360
Kliegl Bros. Universal Electric Stage Lighting Co., Inc., 362
I. Weiss and Sons, Inc., 363

Sprayer, Cleaning Solution
J. I. Holcomb Mfg. Co., 198, 199

Sprayers, Tree & Shrub
Moto-Mower Co., 232

Sprinkler Systems, Fire
Rockwood Sprinkler Co., 144, 145

Stacks, Library
Art Metal Construction Co., 389-396

Stadium Repairing, Concrete
United Laboratories, Inc., 214

Stadiums (see Grandstands)

Stage Equipment, Electrical
Capitol Stage Lighting Co., 353-360
Kliegl Bros. Universal Electric Stage Lighting Co., Inc., 362
I. Weiss and Sons, Inc., 363

Stage Equipment (Rigging & Hardware)
Automatic Devices Co., 352
J. R. Clancy Inc., 361
I. Weiss and Sons, Inc., 363

Stage Lighting Apparatus & Supplies
Capitol Stage Lighting Co., 353-360
Graybar Electric Co., 128
Kliegl Bros. Universal Electric Stage Lighting Co., Inc., 362
I. Weiss and Sons, Inc., 363

Stage Scenery
I. Weiss and Sons, Inc., 363

Stainless Steel
S. Blickman, Inc., 485
Crucible Steel Co. of America, 475
Nathan Straus-Duparquet, Inc., 486
John Van Range Co., 487

Stair Nosings
B & T Floor Co., 80, 81

Stair Treads
Alberene Stone Corp. of Va., 506
American Concrete Corp., 164
American Mason Safety Tread Co., 82
Bolger-Heller Slate Co., 158
A. C. Horn Co., 191-194
National Terrazzo & Mosaic Assn., 84, 85
Safe Tread Co., 83
Servicised Products Corp., 78
Structural Slate Co., 155

Stair Treads, Resurfacing
United Laboratories, Inc., 214

Standards, Lighting (see Lighting Standards)

Steam Cookers
Cleveland Range Co., 474

Steam Main
American District Steam Co., 101
Ric-wiL Co., 103

Steel Cabinets & Lockers
All-Steel-Equip Co., Inc., 398
Art Metal Construction Co., 389-396
Berger Mfg. Div., Republic Steel Corp., 125; 399
Doehler Metal Furniture Co., Inc., 461-464
Durabilt Steel Locker Co., 400, 401
General Fireproofing Co., 402, 403; 502, 503
Globe-Wernicke Co., 404, 405
Lyon Metal Products, Inc., 410
Fred Medart Manufacturing Co., 280; 411
Metal Office Furniture Co., 406, 407
Remington Rand Inc., 381-388

Steel Flagpoles (see Flagpoles)

Steel Grandstands (see Grandstands)

Steel Roof Deck
Milcor Steel Company, 104, 105

Steel Stadiums (see Grandstands)

Stereopticons
Bausch & Lomb Optical Co., 345; 513
Capitol Stage Lighting Co., 353-360
DeVry Corp., 344
Kliegl Bros. Universal Electric Stage Lighting Co., Inc., 362
Spencer Lens Co., 346; 514
Victor Animatograph Corp., 343

Stills, Solvent Recovery
Barnstead Still and Sterilizer Co., Inc., 510

Stone, Architectural
Alberene Stone Corp. of Va., 506
Bolger-Heller Slate Co., 158
Structural Slate Co., 155

Stoneware, Acid Resisting
Alberene Stone Corp. of Va., 506
General Ceramics Co., 507
Maurice A. Knight, 508
Laboratory Furniture Co., 505

Stools
General Fireproofing Co., 402, 403; 502, 503

Storage Batteries
Thomas A. Edison, Inc., 521
Electric Storage Battery Co., 143; 522

Storage Tanks for Distilled Water
Barnstead Still and Sterilizer Co., Inc., 510

Structural Slate
Bolger-Heller Slate Co., 158
Structural Slate Co., 155

Student Records
Art Metal Construction Co., 389-396
Remington Rand Inc., 381-388

Sub-Floors
Johns-Manville, 86-88
Loxit Co., 74, 75
Thos. Moulding Floor Mfg. Co., 77

Suction Pumps & Cups
Allan J. Coleman, 216

Sumps & Catch Basins, Acid Resisting
Alberene Stone Corp. of Va., 506
General Ceramics Co., 507
Maurice A. Knight, 508

Surfacers
Oliver Machinery Co., 543
Stanley Tools, 521
Walker-Turner Co., 545
Yates-American Machine Co., 540, 541

Surfacing Compound
Muralo Co., Inc., 213

Surfacing Materials, Road
Socony-Vacuum Oil Co., Inc., 238
Texas Co., 100
United Laboratories, Inc., 214

Swimming Pool Equipment
American Playground Device Co., 288, 289
Anchor Post Fence Co., 239
Chicago Hardware Foundry Co., 116
Crane Co., 117
Everwear Mfg. Co., 290
Fred Medart Manufacturing Co., 280; 411
Mitchell Mfg. Co., 291; 366
Recreation Equipment Co., 292
Speakman Co., 114, 115
Spencer Turbine Co., 215

Swimming Pool Lighting (see Underwater Lighting)

Swimming Pool Paints & Surfacing
United Laboratories, Inc., 214

Swimming Pool Sanitation Systems
Mathieson Alkali Works, 284
Pennsylvania Salt Mfg. Co., 285
Wallace & Tiernan Co., Inc., 287

Swimming Pools
American Concrete Corp., 164
Pittsburgh-Des Moines Steel Co., 281

Swings
American Playground Device Co., 288, 289
Anchor Post Fence Co., 239
Everwear Mfg. Co., 290
Fred Medart Manufacturing Co., 280; 411
Mitchell Mfg. Co., 291; 366
Recreation Equipment Co., 292

Switchboards, Light Control
Capitol Stage Lighting Co., 353-360
General Electric Co., 124; 274, 275; 320; 515-518

Systems, Loose Leaf
Remington Rand Inc., 381-388

Table Tennis Tables
Durabilt Steel Locker Co., 400, 401
Mitchell Mfg. Co., 291; 366

Tables
All-Steel-Equip Co., Inc., 398
Art Metal Construction Co., 389-396
Bacon and Vincent Co., 445-452
Berger Mfg. Div., Republic Steel Corp., 125; 399
S. Blickman, Inc., 485
Brewer-Titchener Corp., 365
Doehler Metal Furniture Co., Inc., 461-464
Excel Metal Cabinet Co., Inc., 444
General Fireproofing Co., 402, 403; 502, 503
Globe-Wernicke Co., 404, 405
Laboratory Furniture Co., 505
Metal Office Furniture Co., 406, 407
Mitchell Mfg. Co., 291; 366
Mutschler Brothers Co., 604
Neumade Products Corp., 324
Remington Rand Inc., 381-388
Security Steel Equipment Corp., 408, 409
Universal Equipment Co., 465
Whitehead Metal Products, 453-460

Tables, Folding
Brewer-Titchener Corp., 365
Mitchell Mfg. Co., 291; 366

Tables & Table Tops, Cafeteria
S. Blickman, Inc., 485
General Fireproofing Co., 402, 403; 502, 503
Mitchell Mfg. Co., 291; 366
Mutschler Brothers Co., 604
Nathan Straus-Duparquet, Inc., 486
John Van Range Co., 487

Tables & Table Tops, Laboratory
Alberene Stone Corp. of Va., 506
General Fireproofing Co., 402, 403; 502, 503
Laboratory Furniture Co., 505
Structural Slate Co., 155

Tablet Machines
F. J. Stokes Machine Co., 512

Tablets, Metal
Acme Bulletin & Directory Board Corp., 483
Akins Sales Co., Inc., 167
General Bronze Corp., 149
James H. Matthews & Co., 161
Stewart Iron Works Co., 244

Tabulating Machines
Remington Rand Inc., 381-388

Talking Motion Pictures
Bell & Howell Co., 342
Erpi Classroom Films, Inc., 321-323

Talking Picture Equipment
Ampro Corp., 341
Bell & Howell Co., 342
DeVry Corp., 344
RCA Mfg. Co., Inc., 325-340

Tanks, Acid & Chemical Resisting
Alberene Stone Corp. of Va., 506
General Ceramics Co., 507
Maurice A. Knight, 508
Laboratory Furniture Co., 505

Tea
John Sexton & Co., 488

Teaching Films
Bell & Howell Co., 342
Erpi Classroom Films Inc., 321-323
General Electric Co., 124; 274, 275; 320; 515-518

Telephone Systems
Cincinnati Time Recorder Co., 135
Connecticut Telephone & Electric Corp., 127
Graybar Electric Co., 128
Holtzer-Cabot Electric Co., 136-138; 524
International Business Machines Corp., 140, 141

Telescopes
Bausch & Lomb Optical Co., 345; 513

Temperature Regulation
Powers Regulator Co., 110, 111
Warren Webster & Co., 112

Tennis Court Backstops
Anchor Post Fence Co., 239
Colorado Fuel & Iron Corp., 240
Cyclone Fence Co., 242
W. F. Robertson Steel & Iron Co., 243
Stewart Iron Works Co., 244
Wickwire Spencer Steel Co., 245

Tennis Court Enclosures (see Fencing)

Tennis Court Surfacing
Socony-Vacuum Oil Co., Inc., 238
United Laboratories, Inc., 214

Tennis Court Treatment
Columbia Alkali Corp., 237
Socony-Vacuum Oil Co., Inc., 238
Solvay Sales Corp., 286

Tennis Nets, Wire
American Playground Device Co., 288, 289
Anchor Post Fence Co., 239

Tennis Tables
Durabilt Steel Locker Co., 400, 401
Mitchell Mfg. Co., 291; 366

Terrazzo
American Concrete Corp., 164
National Terrazzo & Mosaic Assn., 84, 85

Textbook Bindings
E. I. du Pont de Nemours & Co., Inc., 622, 623

Textbooks
Dictaphone Corp., 414, 415

Theatrical Equipment
Automatic Devices Co., 352
Capitol Stage Lighting Co., 353-360
J. R. Clancy, Inc., 361
Kliegl Bros. Universal Electric Stage Lighting Co., Inc., 362
I. Weiss & Sons, Inc., 363

Thermocouples
General Radio Co., 523
Rawson Electrical Instrument Co., 519

Thermometers, Dial
Powers Regulator Co., 110, 111

Thermostats
Powers Regulator Co., 110, 111

Thresholds
Structural Slate Co., 155

Through-Wall Flashing
American Brass Co., 96
Revere Copper & Brass Inc., 166

Tile, Acoustical
Celotex Corp., 89-91
Johns-Manville, 86-88
Loxit Co., 92-94

Tile Cleaner
Hillyard Sales Co., 196, 197
J. I. Holcomb Mfg. Co., 198, 199
A. C. Horn Co., 191-194
Midland Chemical Laboratories, Inc., 200, 201

Tile, Cork Composition
Armstrong Cork Co., 69
Congoleum-Nairn Inc., 70, 71

Tile, Cork-Rubber
Servicised Products Corp., 78

Tile, Drain Foundation
Ric-wiL Co., 103

Tile Flooring (see Flooring)

Tile, Rubber
Goodyear Tire & Rubber Co., Inc., 76
Wright Rubber Products Co., 79

Tile, Wall
Wood Conversion Co., 95

Time Recorders
Cincinnati Time Recorder Co., 135

Time Stamps
Cincinnati Time Recorder Co., 135

Timers, Electric Sports
Cincinnati Time Recorder Co., 135
International Business Machines Corp., 140, 141
Warren Telechron Co., 139

Toilet Partitions
Alberene Stone Corp. of Va., 506

Toilet Tissue
West Disinfecting Co., 204, 205

Tool Cribs
General Fireproofing Co., 402, 403; 502, 503
Lyon Metal Products, Inc., 410

Tool Sets, Student
Brown & Sharpe Mfg. Co., 538, 539

Tools & Cutters, Shop
Brown & Sharpe Mfg. Co., 538, 539
New Britain Machine Co., 548
Stanley Tools Div., Stanley Works, 536

Tools, Electric
R. L. Carter Div., Stanley Works, 537
Stanley Electric Tool Div., Stanley Works, 535

Tools, Sheet Metal Working
Peck, Stow & Wilcox Co., 546

Towels, Electric
Chicago Hardware Foundry Co., 116

Towels, Paper,
West Disinfecting Co., 204, 205

Transfer Cases, Steel
All-Steel-Equip Co., Inc., 398

Transformers
General Electric Co., 124; 274, 275; 320; 515-518

Traps, Steam & Radiator
American District Steam Co., 101
Powers Regulator Co., 110, 111
Warren Webster & Co., 112

Trays, Serving
Aluminum Cooking Utensil Co., 478
Chelsea Products, 484
John Van Range Co., 487

Treads, Safety Stair
Alberene Stone Corp. of Va., 506
American Concrete Corp., 164
American Mason Safety Tread Co., 82
A. C. Horn Co., 191-194
National Terrazzo & Mosaic Assn., 84, 85
Safe Tread Co., 83
Servicised Products Corp., 78
Structural Slate Co., 155

Treads, Safety Stair, Resurfacing
United Laboratories, Inc., 214

Troughs, Blackboard Crayon
Loxit Co., 156, 157
Milcor Steel Company, 104, 105

Troughs, Laboratory Table
Maurice A. Knight, 508

Trucks, Chair (see Chair Trucks)

Tubs, Stoneware, Acid-Resisting
Alberene Stone Corp. of Va., 506
General Ceramics Co., 507
Maurice A. Knight, 508
Laboratory Furniture Co., 505

Type, Printing
American Type Founders, 547

Typewriter Supplies
Miller-Bryant-Pierce Co., 419
Remington Rand Inc., 381-388
Underwood Elliott Fisher Co., 416, 417

Typewriters
Remington Rand Inc., 381-388
Underwood Elliott Fisher Co., 416, 417

Underwater Lighting
Westinghouse Electric & Mfg. Co., 123; 277

Unit Ventilation
John J. Nesbitt, Inc., 108
B. F. Sturtevant Co., 109

Urinals
Crane Co., 117

Urns, Coffee (see Coffee Urns)

Vacuum Cleaners, Portable, Heavy Duty
Hild Floor Machine Co., 208, 209
Kent Co., Inc., 210
Spencer Turbine Co., 215
B. F. Sturtevant Co., 109

Vacuum Cleaning Systems
Spencer Turbine Co., 215
B. F. Sturtevant Co., 109

Vacuum Driers & Evaporators
F. J. Stokes Machine Co., 512

Vacuum Pumps & Compressors
F. J. Stokes Machine Co., 512

Vacuum Tubes
General Electric Co., 124; 274, 275; 320; 515-518

Valves, Flush
Crane Co., 117
Speakman Co., 114, 115

Valves, Mixing
Powers Regulator Co., 110, 111

Valves, Radiator
American District Steam Co., 101
Powers Regulator Co., 110, 111
Warren Webster & Co., 112

Valves, Soap Dispensing
West Disinfecting Co., 204, 205

Varnishes
American Crayon Co., 195
Hillyard Sales Co., 196, 197
United Laboratories, Inc., 214

Vending Machines, Sanitary Napkin
West Disinfecting Co., 204, 205

Veneers
Celotex Corp., 89-91

Venetian Blinds
Athey Co., 150, 151

Ventilating Pipe & Fittings
Duriron Co., 509
General Ceramics Co., 507
Maurice A. Knight, 508
Pacific Foundry Co., Ltd., 504

Ventilating Units
John J. Nesbitt, Inc., 108
B. F. Sturtevant Co., 109

Ventilators, Roof
Milcor Steel Company, 104, 105

Visible Record Forms and Equipment
Art Metal Construction Co., 389-396
General Fireproofing Co., 402, 403; 502, 503
Globe-Wernicke Co., 404, 405
Remington Rand Inc., 381-388
Yawman & Erbe Mfg. Co., 397

Voltmeters (see Meters, Electric)

Wainscoting
Alberene Stone Corp. of Va., 506
American Concrete Corp., 164
Bolger-Heller Slate Co., 158
Congoleum-Nairn Inc., 70, 71
Thos. Moulding Floor Mfg. Co., 77
National Terrazzo & Mosaic Assn., 84, 85
Structural Slate Co., 155
Tile-Tex Co., 65-68
Wood Conversion Co., 95
Wright Rubber Products Co., 79

Wallboard
Wood Conversion Co., 95

Wall-Covering, Cork Composition
Armstrong Cork Co., 69
Congoleum-Nairn Inc., 70, 71

Wall-Covering, Rubber
Goodyear Tire & Rubber Co., Inc., 76

Wall Panels, Asbestos-Cement
Ruberoid Co., 99

Wall Tile
Tile-Tex Co., 65-68

Wardrobes, Steel
All-Steel-Equip Co., Inc., 398
Art Metal Construction Co., 389-396
Berger Mfg. Div., Republic Steel Corp., 125; 399
Doehler Metal Furniture Co., Inc., 461-464
Durabilt Steel Locker Co., 400, 401
General Fireproofing Co., 402, 403; 502, 503
Globe-Wernicke Co., 404, 405
Lyon Metal Products, Inc., 410
Fred Medart Manufacturing Co., 280; 411
Metal Office Furniture Co., 406, 407
Remington Rand Inc., 381-388
Security Steel Equipment Corp., 408, 409

Washers, Blueprint
Wickes Bros., 550

Washroom Equipment
Chicago Hardware Foundry Co., 116
Crane Co., 117
J. I. Holcomb Mfg. Co., 198, 199
Midland Chemical Laboratories, Inc., 200, 201
Speakman Co., 114, 115
West Disinfecting Co., 204, 205

Waste Baskets
Globe-Wernicke Co., 404, 405
National Vulcanized Fibre Co., 420

Waste Disposal (see Incinerators)

Watercloset Cleaners, Wire
Allan J. Coleman, 216

Waterclosets
Crane Co., 117

Water Coolers
Halsey W. Taylor Co., 118

Water Heaters
American District Steam Co., 101

Waterproofing
Barrett Co., 97
Philip Carey Co., Inc., 98
A. C. Horn Co., 191-194
Servicised Products Corp., 78
United Laboratories, Inc., 214

Water Purification
Mathieson Alkali Works, 284
Pennsylvania Salt Mfg. Co., 285
Wallace & Tiernan Co., Inc., 287

Water Softener
Midland Chemical Laboratories, Inc., 200, 201

Water Sport Devices
American Playground Device Co., 288, 289
Everwear Mfg. Co.,
Mitchell Mfg. Co., 291; 366
Recreation Equipment Co., 292

Water Stills
F. J. Stokes Machine Co., 512

Wattmeters (see Meters, Electric)

Waxes, Floor
American Crayon Co., 195
General Floorcraft, Inc., 207
Hillyard Sales Co., 196, 197
J. I. Holcomb Mfg. Co., 198, 199
A. C. Horn Co., 191-194
Midland Chemical Laboratories, Inc., 200, 201
Thos. Moulding Floor Mfg. Co., 77
Selig Co., 200, 201
United Laboratories, Inc., 214
West Disinfecting Co., 204, 205

Waxing Machines, Electric
Advance Machine Co., Inc., 206
General Floorcraft, Inc., 207
Hillyard Sales Co., 196, 197
Lincoln-Schlueter Floor Machinery Co., Inc., 211
Midland Chemical Laboratories, Inc., 200, 201
G. H. Tennant Co., 212

Weather Stripping
Athey Co., 150, 151
A. C. Horn Co., 191-194

Window Guards, Iron & Wire
Cyclone Fence Co., 242
Stewart Iron Works Co., 244

Window Shades
Athey Co., 150, 151
Columbus Coated Fabrics Corp., 152
E. I. du Pont de Nemours & Co., Inc., 622, 623

Windows, Casement
General Bronze Corp., 149

Windows, Double Hung
General Bronze Corp., 149

Windows, Horizontally Pivoted
General Bronze Corp., 149

Wire Work, Ornamental
Stewart Iron Works Co., 244

Wiring Supplies
Graybar Electric Co., 128

Wood Block Flooring
Jennison-Wright Co., 72, 73

Woodworking Machinery
Delta Mfg. Co., 542
Oliver Machinery Co., 543
South Bend Lathe Works, 544
Walker-Turner Co., Inc., 545
Yates-American Machine Co., 540, 541

Work-Benches
Lyon Metal Products, Inc., 410
New Britain Machine Co., 548
Oliver Machinery Co., 543

Wrenches
New Britain Machine Co., 548

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Index to Advertisers

A

Acme Bulletin & Directory Board Corporation.. 483
Advance Machine Company, Inc..... 206
Akins Sales Co., Inc..... 167
Alberene Stone Corporation of Virginia..... 506
All-Steel-Equip Company, Inc..... 398
Aluminum Cooking Utensil Company, The..... 478
American Brass Company, The..... 96
American Concrete Corporation..... 164
American Crayon Company, The 195
American District Steam Company..... 101
American Mason Safety Tread Co..... 82
American Optical Company..... 347
American Playground Device Co.....288, 289
American Type Founders 547
American Window Glass Company..... 563
Ampro Corporation 341
Anchor Post Fence Company..... 239
Armstrong Cork Company..... 69
Art Metal Construction Company.....389–396
Athey Company 150, 151
Atlas Portable Bleacher Co..... 278
Automatic Devices Co..... 352

B

B & T Floor Company 80, 81
Bacon and Vincent Company, Inc.....445–452
Barnstead Still and Sterilizer Co., Inc..... 510
Barrett Company, The..... 97
Bassick Company, The.....364; 470
Bausch & Lomb Optical Company.....345; 513
Bell & Howell Company..... 342
Benjamin Electric Mfg. Co.....272, 273
Berger Manufacturing Division, Republic Steel Corporation 125; 399
Blickman, Inc., S..... 485
Blodgett Co., Inc., The G. S..... 473
Bolger-Heller Slate Co..:..... 158
Brewer-Titchener Corporation, The..... 365
Brown & Sharpe Mfg. Co.....538, 539
Buckeye Glide Company, Inc..... 472

C

Capitol Stage Lighting Company.....353–360
Carey Company, The Philip..... 98
Celotex Corporation, The.....89–91
Chase Brass & Copper Co..... 119
Chelsea Products 484
Chicago Hardware Foundry Co., The..... 116
Cincinnati Time Recorder Company, The..... 135
Clancy, Inc., J. R..... 361
Cleveland Range Co., The..... 474
Coldwell Lawn Mower Company..... 235
Cole Nursery Company, The..... 229
Coleman, Allen J..... 216
Colorado Fuel and Iron Corporation, The..... 240
Columbia Alkali Corporation, The..... 237
Columbus Coated Fabrics Corporation..... 152
Congoleum-Nairn, Inc.....70, 71
Connecticut Telephone & Electric Corp..... 127
Continental Steel Corporation..... 241
Cornell Iron Works, Inc..... 148
Corning Glass Works, Macbeth-Evans Division 120, 121
Crane Co. 117
Crouse-Hinds 276
Crucible Steel Co. of America..... 475
Cyclone Fence Company..... 242

D

Da-Lite Screen Co., Inc.....348, 349
Delta Manufacturing Company..... 542
DeVry Corporation 344
Dictaphone Corporation.....414, 415
Ditto, Incorporated 418
Doehler Metal Furniture Co., Inc.....461–464
Du Pont De Nemours & Co., Inc., E. I.....622, 623
Durabilt Steel Locker Co.....400, 401
Duriron Company, Inc., The..... 509

E

Eaton-Dikeman Company, The..... 511
Ediphone, The—Thomas A. Edison, Inc.....412, 413
Edison General Electric Appliance Company, Inc. 476
Edison Storage Battery, Division of Thomas A. Edison, Inc..... 521
Ehret Magnesia Manufacturing Co..... 102
Electric Storage Battery Company, The.....143; 522
Erpi Classroom Films Inc.....321–323
Everwear Manufacturing Company, The..... 290
Excel Metal Cabinet Co., Inc..... 444

F

Faultless Caster Corporation..... 471

G

Gamewell Company, The.....129–134
General Bronze Corporation..... 149
General Ceramics Company..... 507
General Electric Company 124; 274, 275; 320; 515–518

General Fireproofing Company, The 402, 403; 502, 503
General Floorcraft, Inc. 207
General Radio Company 523
Globe-Wernicke Co., The 404, 405
Goodyear Tire & Rubber Company, Inc, The 76
Gravely Manufacturing Company 230
Graybar Electric Company 128

H

Hild Floor Machine Company 208, 209
Hillyard Sales Company, The 196, 197
Hobart Manufacturing Co., The 481
Holcomb Mfg. Company, J. I. 198, 199
Holtzer-Cabot Electric Co., The 136–138; 524
Horn Company, A. C. 191–194

I

International Business Machines Corp. 140, 141
International Harvester Company (Incorporated) 566
Ironrite Ironer Company, The 442

J

Jacobsen Manufacturing Co. 231
Jennison-Wright Company, The 72, 73
Johns-Manville 86–88

K

Kent Company, Inc., The 210
Kerner Incinerator Company 113
Kinnear Manufacturing Co., The 146, 147
Kliegl Bros. Universal Electric Stage Lighting Co., Inc. 362
Knight, Maurice A. 508

L

Laboratory Furniture Co., Inc. 505
Leavitt Corporation 279
Lincoln-Schlueter Floor-Machinery Company, Inc. 211
Lingo & Son, Inc., John E. 168
Loxit Company, The 74, 75; 92–94; 156, 157
Lyon Metal Products, Incorporated 410

M

Mathieson Alkali Works (Inc.), The 284
Matthews & Co., Jas. H. 161
Medart Manufacturing Co., Fred 280; 411
Metal Office Furniture Company 406, 407
Miami Cabinet Division, The Philip Carey Company 468, 469
Midland Chemical Laboratories, Inc. 200, 201
Milcor Steel Company 104, 105
Miller-Bryant-Pierce, Division of L. C. Smith 419
Mitchell Manufacturing Co. 291; 366
Montgomery Time Systems 142
Moore, Inc., P. O. 162, 163
Moto-Mower Company, The 232
Moulding Floor Mfg. Co., Thos. 77
Mueller Company 106
Muralo Company, Inc., The 213
Mutschler Brothers Company 604

N

Nash Engineering Company, The 107
National Lock Co. 379
National Terrazzo and Mosaic Association, The 84, 85
National Vulcanized Fibre Co. 420
Natural Slate Blackboard Co. 154
Nesbitt, Inc., John J. 108
Neumade Products Corp. 324
New Britain Machine Co., The 548
Norton Door Closer Company 159
Norton Lasier Company 160

O

Oliver Machinery Company 543
Ozalid Corp. 549

P

Pacific Foundry Company, Ltd. 504
Peck, Stow & Wilcox Company, The 546
Pennsylvania Salt Manufacturing Co. 285
Pittsburgh-Corning Corporation 153
Pittsburgh-Des Moines Steel Company 281
Powers Regulator Company, The 110, 111

R

Rawson Electrical Instrument Co. (Incorporated) 519
RCA Manufacturing Company, Inc. 325–340
Recreation Equipment Co. 292
Remington Rand Inc. 381–388
Revere Copper and Brass Incorporated 166
Ric-wiL Company, The 103
Robertson Steel & Iron Company, W. F. 243
Rockwood Sprinkler Company 144, 145
Ruberoid Co., The 99

S

Safe Tread Co. 83
Security Steel Equipment Corporation 408, 409
Selig Company, The 202, 203
Servicised Products Corporation 78
Sexton & Co., John 488
Silex Company, The 479
Simmons Company 466, 467
Singer Sewing Machine Company 443
Smith's Sons Company, John E. 482

Socony-Vacuum Oil Company, Inc., Standard Oil of New York Division 238
Solvay Sales Corporation 286
South Bend Lathe Works 544
Speakman Company 114, 115
Spencer Lens Company 346; 514
Spencer Turbine Company, The 215
Standard Gas Equipment Corporation 477
Standard Mfg. & Sales Corporation 233
Stanley Works, The
Carter Division, The R. L. 537
Stanley Electric Tool Division 535
Stanley Tools 536
Stewart Iron Works Company, The 244
Stokes Machine Company, F. J. 512
Straus-Duparquet, Inc., Nathan 486
Structural Slate Company, The 155
Sturtevant Company, B. F. 109
Superior Coach Corporation 564, 565

T

Tablet & Ticket Co., The 367
Taylor Co., The Halsey W. 118
Tennant Company, G. H. 212
Texas Company, The 100
Thomas-Smith Company, The 603
Tile-Tex Company, The 65–68
Toro Manufacturing Corporation 236
Traffic & Street Sign Company 165

U

Underwood Elliott Fisher Company 416, 417
United Laboratories, Incorporated 214
Universal Bleacher Co. 282
Universal Equipment Company 465

V

Van Range Co., The John 487
Victor Animatograph Corporation 343

W

Wakefield Brass Company, The F. W. 122
Walker-Turner Co., Inc. 545
Wallace & Sons Mfg. Co., R. 480
Wallace & Tiernan Company, Inc. 287
Warren Telechron Company, The 139
Warren Webster & Company 112
Weiss and Sons, Inc., I. 363
West Disinfecting Company 204, 205
Western Electric Company 350, 351
Westinghouse Electric and Mfg. Co., Lighting Division 123; 277
Weston Electrical Instrument Corp. 126; 520
Whirlwind Lawn Mowers Corporation 234
Whitehead Metal Products 453–460
Wickes Brothers 550
Wickwire Spencer Steel Company 245
Williams Iron Works, Inc. 283
Wood Conversion Company 95
Wright Rubber Products Co. 79

Y

Yale & Towne Mfg. Co., The 380
Yates-American Machine Company 540, 541
Yawman and Erbe Mfg. Co. 397

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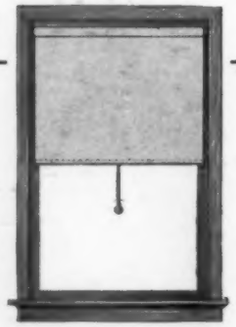
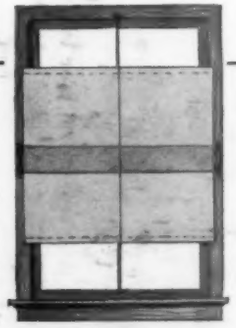
"Bidder shall furnish one shade of the type of material on which he is bidding and furnish affidavit certifying that the shade has been in continuous use for at least nine years. The aforementioned affidavit shall also certify that the shade has been washed at least six times during the nine years in which it has been in use."





• Single-hung shade on inside brackets illustrated above permits wide scope of window decoration treatments.

• Double shade hanging illustrated is unusually popular with schools where exact control of light and ventilation is required.

• Du Pont also makes a new and improved "Triplex" light-proof shade in both light and dark colors for use in laboratories, auditoriums and visual-aid rooms. Samples sent on request.

Textbooks Or *These Important Facts...*

YOUR school books are going to come in for a terrific beating. They're going to get dropped in the mud, thrown in the snow, spattered with water, and battered and thumbed until they'll hardly be recognizable. You might just as well take what precautions you can to make them last longer.

One of the surest ways is to have them bound in "Fabrikoid"* or PX Cloth. These materials have been put through the testing paces—just as "Tontine" shades have—and the punishment they'll take is amazing!

Recommend to your publishers that either of these washable and waterproof materials be used on your books. They'll be glad to oblige (almost all of them have had exceptional experience with both materials)—and you'll get textbooks built to take the punishment they're certain to get. We'll be glad to send samples at any time.

**"Fabrikoid" is Du Pont's reg. trade mark for its pyroxylin coated and impregnated fabric.*

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"FABRIKOID" DIVISION . . . NEWBURGH, N. Y.

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Science at Work, published by Rand McNally & Company.

Latin Third Year, published by Silver Burdett Company.

Bookkeeping for Personal and Business Use, published by The John C. Winston Company.

Lower row, left to right:

Problems and Values of Today, published by Little, Brown & Company.

Building Our Life Together, published by Row, Peterson & Co.

Physics of Today, published by Houghton, Mifflin Company.

Democracy at Work, published by The John C. Winston Company.